The New Zealand

Journal of Agriculture.

VOL. XXIV.—No. 3.

WELLINGTON, 20TH MARCH, 1922.

TESTING OF PUREBRED DAIRY COWS.

THE NEW ZEALAND C.O.R. SYSTEM IN 1921.

W. M. SINGLETON, Director of the Dairy Division.

THE advantages which accrue from the dairy industry to a country such as New Zealand have been presented on many and varied occasions. Possibly, however, even during that period when our dairying districts were erecting dairy factories in maximum numbers the beneficial results to dairy-farmers and to the Dominion were not realized as being of such far-reaching importance as has been the case during the past year. The income which New Zealand has received for dairy-products has been brought into special prominence not only by the increase in that revenue, but by the decrease in returns from certain other staple exports. Our dairy-cow population, so to speak, has increased from year to year until now it numbers not far short of the country's human population. Taking into consideration the scope which yet remains for expansion of the industry, it is probable that dairy cattle may in the near future outnumber the human inhabitants of the Dominion.

The lower range of prices for cheese and butter which have obtained more recently, together with the fact that costs of production, manufacturing, transport, and marketing have not been reduced

proportionately, have caused many dairymen to realize, as never before, the necessity for decreasing production costs by herd-improvement. Never before has there been such an inclination to test the yield of dairy cows. The culling-out of the low producers will leave room for other and better animals. Quite a number of dairy companies are now conducting on their own behalf herd-testing associations, which it is believed will include a larger number of cows than were so tested during the preceding season. Officers of the Dairy Division are testing for some fifty-one associations, as compared with forty associations last season. This increase in association testing is likely to indicate to many dairymen the necessity for heading their herds with purebred butterfat-record sires as a means of herd-improvement, and is further evidence of the growing realization of the value of testing.

Better animals must be bred on the lines of production if satisfactory results are to be obtained. Heredity is the factor which requires greatest consideration in the breeding of better producers. It is unfortunate that all who are dairying do not appreciate as they should the fact that heredity plays such an important role in the improvement of a dairy herd. The certificate-of-record testing-system is bringing this fact home more and more to dairymen, and the necessity for using purebred sires is becoming more widely recognized. Such sires have been brought into newer dairying districts during the past year in greater numbers than heretofore. Credit is due to certain officers of the Division for bringing about some of these changes for the better.

There are, it is safe to say, not nearly sufficient purebred dairy bulls in the Dominion to permit of one being used in each dairy herd. The number of such purebred bulls will, however, keep pace with the demand, and breeders are so alive to the importance of the position that our efforts should be largely centred on increasing such demand. At the present time there is room in New Zealand for a really strong live campaign having for its purpose the elimination of the scrub bull wherever it exists, and the placing of a purebred butterfat-record bull in its stead as head of each respective dairy herd.

EXPORT OF PUREBRED DAIRY CATTLE.

In earlier days New Zealand's outside revenue from dairy-products was solely from exports of butter and cheese. Of later years the revenue from these sources has been augmented by exports of milk-powder and casein, and, mainly as the result of C.O.R. testing, an export trade in dairy cattle has been well started. Although this trade has not potentialities for revenue-production equal to those of butter and cheese, it is nevertheless assuming dimensions which are proving it a useful adjunct in the total revenue from dairying activity. During the year under review some 130 head of purebred dairy cattle have gone from the Dominion to such destinations as Australia, Java, Fiji, Samoa, and Tonga. There can be no doubt that it is the splendid authenticated yields that have attracted the attention of overseas buyers to our good strains of purebred dairy stock.

CHANGE IN SAMPLING-SYSTEM.

The increased number of applications for testing received last spring placed on our lists a certificate-of-record membership which could not be handled by the Division's staff. We therefore made representa-

tions for the appointment of further testing officers, which request met with the reply that owing to the need for extreme economy in regard to the Dominion's finances increased expenditure along this line could not be authorized in the meantime. This meant that one of two procedures must be adopted. Either applications from over one hundred breeders must be declined, or the sampling-period each month must be reduced so that more breeders could be visited with the same staff of testing officers. We obtained the opinion of most of the testing breeders on the executives of the four breeders' associations then co-operating with us, and practically all of these preferred the adoption of a one-day sampling-system rather than that so large a number of breeders—many of whom were about to test for the first time—should be disappointed.

The system was therefore modified accordingly, and during the present season the testing officer visits the breeder for a preliminary milking, when he takes the record of the milk-weights for the two days immediately prior to his visit. He also checks the weight of milk for the milking at the time of his visit, and makes a note of the time by the clock. No sample is taken from the first milking. For the following two or three milkings (according as the cow is milked twice or three times daily) check weights and samples are taken, the last milking to be twenty-four hours later than the first check milking at which the time was taken but no sample. Each milking is tested separately for butterfat, and a calculation made of the amount of butterfat produced at each such milking within the twenty-four hours over which the samples are taken. The average test for the month is calculated from this daily production of milk and fat.

This system is conducive to greater accuracy, inasmuch as the calculated test accurately takes into account variations in the weight of the different milkings sampled. The difficulty of obtaining a truly aliquot sample we considered one of the weakest links in the old system, and it is therefore believed that the new method has, in this point, an important advantage over the old.

It was anticipated that more retesting and perhaps more averaging of abnormal tests would be necessary, owing to the fact that any cause affecting a cow's condition would have a greater influence on the average test than when samples were taken from milkings for two days. A comparison of this season's results with those of the 1920–21 season, however, has proved the present method to be satisfactory on this score.

INCREASE IN TESTING-FEES.

At the inception of the C.O.R. system the nominal fee of £2 per cow or heifer was decided upon. A large proportion of the breeders undertaking testing-work entered more than one animal for test, and some found their entry so heavy that the cows did not get a proper chance to do themselves justice. This was proved in a number of instances when some of the same cows were subsequently re-entered and made much larger records.

The fee of £2 proved to be too low even in pre-war days, and was raised to three guineas. The Department recognized that the service being rendered was in the nature of development-work so far as the Dominion was concerned, and was agreeable to contribute a portion

of the expense. Higher costs for salaries, locomotion, and running-expenses during the war period subsequently led to a further increase as from the 1st January, 1921. Since that date the fee has been five guineas per cow. This higher fee, together with the decrease in the number of testing visits per month to each breeder, has reduced the Department's loss. Such reduction is, however, less than was desired, principally owing to the fact that although more breeders entered cows for testing, a larger proportion entered only one or two cows. This fact, together with the necessity of the Department retrenching wherever possible, has now necessitated a further reconsideration of the testing-fees. It would appear that the breeder who is testing only one or two cows may have to be called upon to pay heavier fees.

CERTIFICATES ISSUED.

Since the commencement of the certificate-of-record testing-system first-class certificates have been issued to 2,159 cows. The total for 1921 of 525 ordinary first-class certificates shows an increase of some 40 per cent. over the issue of similar certificates during the preceding year, which was the largest previous annual issue. In addition to these first-class certificates there have been issued eighty-three repeat first-class certificates to owners of cows which had during previous seasons qualified for certificates. This, too, is higher than the number issued during any previous year, the increase representing 43 per cent. over the number issued during 1920. The following table indicates the position:—

Breed.	1913.	1914.		1915.		1916.		1917.		1918.		1919.		1920.		1921.	
		Ordinary.	Repeat.	Ordinary.	Repeat.	Ordinary.	Repeat.	Ordinary.	Repeat.	Ordinary.	Repeat.	Ordinary.	Repeat.	Ordinary.	Repeat.	Ordinary.	Repeat.
Jersey ..	67	104	14	91	4	94	11	94	13	113	8	150	14	228	33	345	44
Friesian ..	48	67	11	62	9	44	5	62	14	57	14	54	7	82	23	127	25
Milking Shorthorn	..	..	..	2	..	7	..	21	..	22	..	53	3	59	2	31	6
Ayrshire ..	2	15	1	12	1	9	..	4	4	4	..	2	..	5	..	10	1
Red Poll ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	12	7
Totals ..	117	186	26	167	14	154	16	181	31	196	22	259	24	374	58	525	83

Second-class Certificates.

Second-class certificates have been issued on the records of eleven Jerseys, three Friesians, and three Milking Shorthorns. To qualify for a second-class C.O.R. the requirements are the same as those for a first-class certificate, with the exception that cows which owners have endeavoured without success to cause to qualify on subsequent calving for a first-class certificate may calve within the next thirty days beyond the period permitted for the first-class certificate. The issue of second-class certificates was never intended to open up a new class. Breeders must endeavour to have their cows qualify for a first-class certificate

on subsequent calving in order that even a second-class one may be granted. The second-class C.O.R. is issued to such as make a genuine attempt and fail, and it is found to facilitate the advertising of such records in catalogues for sale purposes.

FRIESIANS.

Class-leaders.

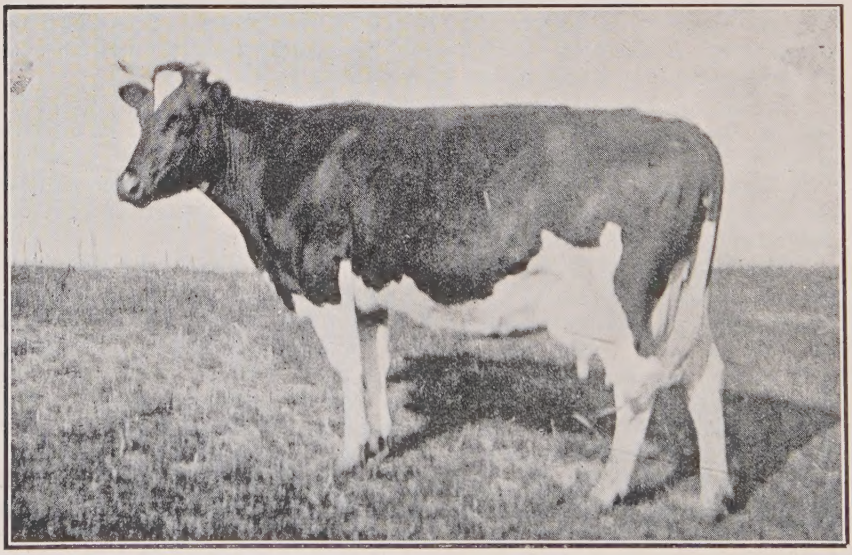
The list of class-leaders for 1921 shows that three animals which previously held pride of place have had to yield to higher producers. This is very gratifying, inasmuch as it is realized that the class-leaderships have now reached a standard where only a phenomenal record can challenge any of them.

The most marked change is found in the senior four-year-old class, Buttercup III of Ashlynn displacing Woodcrest Johanna Tehee by the very creditable margin of 78·30 lb. butterfat. Buttercup III of Ashlynn was owned and tested by Mr. H. R. Green, of Kairanga. She was bred by Mr. C. A. Hopping, who bred, it will be remembered, Manor Beets Daughter II of Ashlynn, leader of the senior three-year-olds. The new leader of the senior four-year-olds is well bred in so far as the expectation of a good record is concerned. Her sire, Dominion Dutchland, is a son of Jessie Fobes Beets (imp.). This cow was a consistent heavy producer, and her twice-a-day-milking record of 545·80 lb. fat scarcely does her justice in comparison with other records extant in New Zealand. The dam of Buttercup III of Ashlynn was an untested daughter of Grace's Netherland of Riverside (imp.), from an untested daughter of Colonel Manor of Riverside (imp.). Both of these sires have proved their ability to transmit factors of milk and butterfat production. Grace's Netherland of Riverside has ten C.O.R. daughters, including Manor Beets Daughter II of Ashlynn, with 863 lb. of butterfat. Colonel Manor of Riverside has six C.O.R. daughters. Buttercup III of Ashlynn is therefore very largely the product of proven lines of ancestry, and is a credit to her inheritance.

In the junior two-year-olds Monavale Queen Bess, with 740·50 lb. fat, exceeds the production of the previous leader, Mr. H. R. Green's Rosa Posch of Oakview, by 21·67 lb. butterfat. The record of Monavale Queen Bess, which was commented upon at length in the *Journal* for November last, is certainly one of which her owner, Mr. T. H. Richards, may well feel proud.

The third change occurs in the junior three-year-old class, Rosevale Queen Daphne, with 675·18 lb. fat, increasing the yield of the previous leader, Mr. R. Melvin's Segis Van Buttercup, by the narrow margin of 9·16 lb. fat. Rosevale Queen Daphne was bred, developed, and tested by Messrs. H. North and Sons, Omimi, the owners of Burkeyje Sylvia Posch. She was on test the previous season, when as a junior two-year-old she produced 509·82 lb. fat. These two records constitute a very fine performance. Rosevale Queen Daphne is by Rosevale Korndyke Sylvia Posch from Rosevale Holland Queen. Rosevale Korndyke Sylvia Posch has four C.O.R. daughters, and among them is a junior two-year-old with a production of 529·45 lb. fat. He is by Bruce of Pleasant Valley, sire of Rosevale Beets de Kol, which produced 615·09 lb. butterfat as a junior three-year-old, and of Rosevale Pietje Korndyke and Rosevale Rhoda Posch, which as junior four-

BUTTERCUP III OF ASHLYNN (H. R. GREEN, KAIRANGA).
Leader of the Friesian senior four-year-old class (see table opposite).



COLANTHA LA FAVOURITE (MARCHANT AND SONS, CARDIFF).
C.O.R. 1921: 6 years 26 days; in 350 days, 22,351 lb. milk, 810·75 lb. butterfat.

year-olds produced 572·27 lb. and 645·36 lb. fat respectively. Burkeyje Sylvia Posch, which yet remains New Zealand's champion cow, requires no comment here. Rosevale Holland Queen, the dam of Rosevale Queen Daphne, has two certificates of record—one for 657·39 lb. fat as a junior three-year-old, and one for 560·41 lb. fat as a senior four-year-old. In the pedigree of Rosevale Holland Queen appear such well-known names as Netherland King of Rosevale (sire), with five C.O.R. daughters, including three productions of over 600 lb. fat; Holland Queen II (dam), with certificate of record for 413·18 lb. fat as a junior two-year-old; Longbeach Van Tromp, sire of eleven C.O.R. daughters; Cliffside Laddie, sire of nineteen C.O.R. daughters; and Netherland Queen VII, with a C.O.R. for 659·31 lb. fat.

The leaders at the end of 1921 stand as follows:—

Name of Cow and Class.	Tested by	Age at starting Test.	Fat req'd. for Cert.	Yield for Season.		
				Days.	Milk.	Fat.
Junior Two-year-old.		Yrs. dys.	lb.		lb.	lb.
Monavale Queen Bess	T. H. Richards, Cardiff	2 16	242·1	365	20,501·10	740·50
Senior Two-year-old.						
Netherland Princess IV	John Donald, Westmere	2 341	274·6	365	19,621·60	805·77
Junior Three-year-old.						
Rosevale Queen Daphne	H. North and Sons, Omimi	3 136	290·6	365	17,956·50	675·18
Senior Three-year-old.						
Manor Beets Daughter II of Ashlynn	C. A. Hopping, Palmerston North	3 296	306·6	365	18,733·90	863·51
Junior Four-year-old.						
Westmere Princess Pietertje	John Donald, Westmere	4 156	329·1	365	24,199·00	939·78
Senior Four-year-old.						
Buttercup III of Ashlynn	H. R. Green, Kairanga	4 305	344·0	365	20,694·25	833·26
Mature.						
Burkeyje Sylvia Posch	H. North and Sons, Omimi	6 129	350·0	365	26,226·00	983·20

Class-averages.

Of the seven classes into which the Friesians are subdivided three show an increase and four a decrease in average production. It is pleasing to note that two of the three classes with increased production also show an increased number of certificates issued over that of the preceding year. The mature class for the breed had more entries than had any other class, and it is creditable that the two classes representing the older animals averaged well over 500 lb. of butterfat. The effect of these figures is seen in the high average of 454·96 lb. of fat for the breed for the year. Although this is a little lower than that of the previous year, the figures are probably not less satisfactory when it is understood that there was an increase of some 44 per cent. in the number of certificates issued.

The class-averages for the past two years are as follows :—

Class.	Number of Cows.	Average Yield for Season.		
		Days in Milk.	Milk.	Fat.
	1921.		lb.	lb.
Junior two-year-old ..	36	336	10,485·5	382·85
Senior two-year-old ..	24	337	11,419·1	409·03
Junior three-year-old ..	15	332	12,959·2	461·19
Senior three-year-old ..	19	335	12,947·8	469·13
Junior four-year-old ..	8	327	13,566·1	478·67
Senior four-year-old ..	7	362	15,858·7	561·87
Mature	42	341	14,588·7	512·06
	1920.			
Junior two-year-old ..	30	346	10,381·3	378·00
Senior two-year-old ..	12	349	11,741·6	421·95
Junior three-year-old ..	10	344	12,849·8	482·07
Senior three-year-old ..	11	359	12,456·2	448·99
Junior four-year-old ..	8	322	12,863·5	470·08
Senior four-year-old ..	6	341	16,068·7	565·68
Mature	28	339	14,938·9	531·06

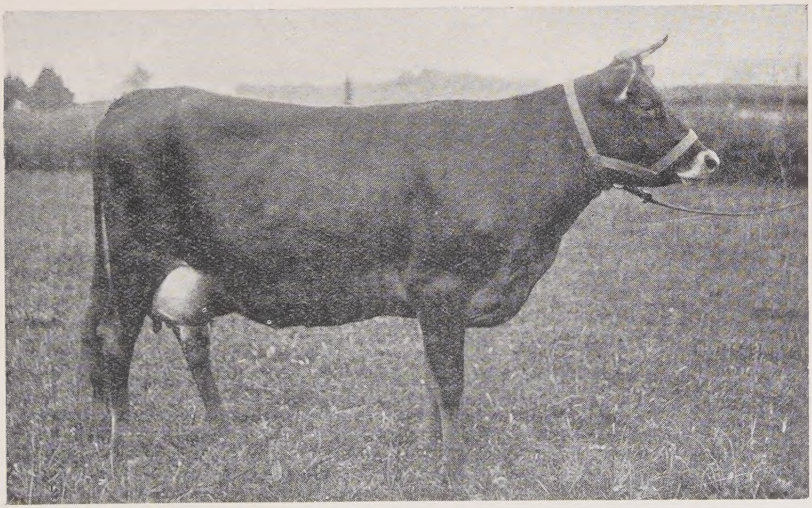
C.O.R. Bulls.

In comparing the number of certificated daughters from bulls which have qualified for our C.O.R. list with the total number of cows receiving certificates it is found that in the Friesian breed 50 per cent. of the certificated cows are from C.O.R. bulls. This is a pleasing and interesting fact, and seems to show that breeders, having proved a sire's ability to transmit productive capacity, are continuing to breed along proven lines. This method must be conducive to improvement in dairy stock, and with the large number of C.O.R. bulls and cows now credited to this breed there should be less difficulty in the selection of blood which will avoid too close inbreeding and yet not endanger herd-improvement.

The outstanding features of the appended list are doubtless the number of new bulls which have gained admittance, and the number of C.O.R. daughters added to the credit of Woodcrest Joe and King Fayne Segis II respectively. These bulls were both imported from North America, and represent what is known as the "American" type. It is doubtless the case that during his lifetime neither bull was held in such high esteem as is the case to-day. It is "by their fruits" that we know them better, although a few who had more intimate knowledge of a number of the individuals in their pedigrees realized from the outset that they should give a good account of themselves. Had these bulls their lives to live over again in New Zealand they would doubtless get a greater opportunity to live on through a larger number of descendants.

Name of Bull.	Total of C.O.R. Daughters.	Number of Daughters qualified during 1921.	Name of Bull.	Total of C.O.R. Daughters.	Number of Daughters qualified during 1921.
King Segis Wild Rose Homestead	19	0	Woodcrest Pietje Pontiac*	5	3
Cliffside Laddie ..	19	0	King of Dominos ..	5†	0†
Sir de Kol Inka Pietertje	15	0	Dominion de Kol Domino	5	0
King Fayne Segis II	15	5	Colantha Johanna Lad	5	0
Kruger II ..	13	0	Bainfield Prince ..	5	1
Woodcrest Joe ..	12	7	Netherland King of Rosevale	5	1
De Kol Pontiac Burke	11	1	King Segis of Friesland Park*	4	3
Longbeach Van Tromp	11	0	Colantha Johanna*	4	2
Paul Pietertje ..	11	0	Colantha Pietertje Count de Kol*	4	2
Woodcrest Hengerveld Mechthilde	11†	1†	Indi Paul of Lakeside*	4	2
Prince Pietje Paxton	10	0	Longbeach Major* ..	4	1
Nazli de Kol ..	10	0	Rosevale Korndyke Sylvia Posch*	4	1
Grace's Netherland of Riverside	10	0	Mutual Mercedes Pietertje*	4	2
Mutual Piebe de Kol	9	0	Oakwood Holland King*	4	1
Mutual Piebe of Rock	8	1	Colantha Pontiac* ..	4	1
Oak de Kol II Homestead Fobes	7	1	Longbeach Dutchman	4	0
Edinglassie ..	7	0	Netherland King ..	4	0
Sir Colantha Korndyke Rag Apple*	6	5	Pietertje Boy ..	4	0
Bainfield Dutchman	6	1	Rozine's Butter Boy	4	0
Colonel Manor of Riverside	6	0			
Longbeach Primrose League	6	0			

* Qualified during 1921. † Also one second-class-certificate daughter.



JERSEY HEIFER GONERIL (C. G. GIBBONS, NGAERE).

C.O R., 1921: 2 years 41 days; in 347 days, 11,680·6 lb. milk, 652·43 lb. butterfat.

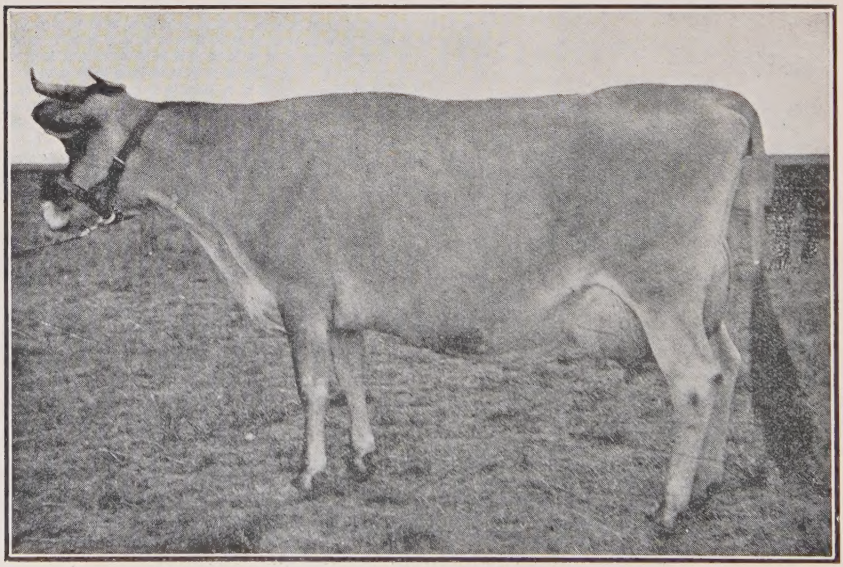
JERSEYS.

Class-leaders.

Although certificates have been issued during the year on some unusually fine performances, none of the Jersey class-leaderships as at the end of 1920 has been successfully challenged. The outstanding production of the year was that of Mr. H. B. Lepper's Elf's Beauty, which, commencing at the age of 7 years 69 days, produced in 365 days 13,679·65 lb. milk containing 800·75 lb. butterfat.

The list as for last year is reprinted as follows :—

Name of Cow and Class.	Tested by	Age at starting Test.	Fat req'd. for Cert.	Yield for Season.		
				Days.	Milk.	Fat.
Junior Two-year-old.		Y. dys.	lb.		lb.	lb.
Aster's August Child	James Nicolson, Kaupokonui	1 337	240·5	365	11,498·5	689·05
Senior Two-year-old.						
Lady Superior ..	John Hale, New Plymouth	2 183	258·8	365	9,975·5	680·33
Three-year-old.						
Woodstock's Baby ..	Mrs. A. Banks and Son, Kiwitea	3 302	307·2	365	12,329·7	657·91
Four-year-old.						
Woodstock's Fancy Free	Mrs. A. Banks and Son, Kiwitea	4 111	324·6	364	15,562·5	770·35
Mature.						
Sultan's Daisy ..	E. O'Sullivan and Sons, Tariki	6 344	350·0	365	13,502·7	968·22



ELF'S BEAUTY (H. B. LEPPER, LEPPERTON).
C.O.R., 1921 : 7 years 69 days; in 365 days, 13,679·65 lb. milk, 800·75 lb. butterfat.

Class-averages.

Each of the classes for Jerseys shows a larger number of certificates issued than was the case during the preceding year. The larger numbers were to a considerable extent due to entries from new breeders. This may, to a marked degree, account for the lower average yield for each class. The tendency appears to indicate an inclination to enter more two-year-olds. The percentage which these form of the total—38·8—shows an increase of over 9 per cent. The effect of such a large percentage of two-year-olds on the general averages for all cows entered for the breed is manifest. The average yield for the three-year-olds has been best maintained, but this class shows the smallest increase in numbers tested. Inasmuch as the total Jerseys tested evidence an increase of all but 50 per cent. over the previous year's figures, the drop of some 5 per cent. in the average production cannot be taken as representing any serious falling-off.

The figures for 1920 and 1921 are as follows :—

Class.	Number of Cows.	Average Yield for Season.		
		Days in Milk.	Milk.	Fat.
	1921.		lb.	lb.
Junior two-year-old ..	151	342	6,281·1	351·37
Senior two-year-old ..	36	337	6,844·5	385·65
Three-year-old	55	332	7,620·3	430·67
Four-year-old	50	343	8,147·0	467·80
Mature	97	340	8,686·5	478·39
	1920.			
Junior two-year-old ..	78	344	6,701·3	370·96
Senior two-year-old ..	29	341	7,337·7	406·52
Three-year-old	52	339	7,836·3	432·64
Four-year-old	29	349	9,185·3	487·99
Mature	73	343	8,975·1	499·62

C.O.R. Bulls.

The Jersey C.O.R. bull list now includes no less than eighty-two names, twenty-four of which have been added during 1921. This increase is greater than has been the case in any previous year. The certificated daughters which C.O.R. Jersey bulls now have to their credit represent some 48 per cent. of the total number of certificated Jersey females. The breed has reason to be proud of this position.

Majesty's Fox and Eminent's Fontaine again hold pride of place, and each has added two daughters to the C.O.R. list during the year. Six daughters of Lady's Duke and six of Sultan's Disdain were granted first-class certificates during 1921. No other bulls previously on the list have added so many daughters during the year. Of the daughters of Sultan's Disdain, one produced 669·02 lb. fat, one 591·48 lb. fat, and two others have passed the 500-lb.-fat mark. All nine daughters credited to Lady's Duke were tested on their first calving, six of them being yearlings, and, considering this, have produced well. Lady's Duke

is by Silverlock's Duke, sire of four C.O.R. daughters, and from Majestic Lady, who qualified for certificate with a production of 409·84 lb. fat as a three-year-old.

The list is as follows :—

Name of Bull.	Total of C.O.R. Daughters.	Number of Daughters qualified during 1921.	Name of Bull.	Total of C.O.R. Daughters.	Number of Daughters qualified during 1921.
Majesty's Fox ..	29	2	Belvedere Butter Boy	6	0
Eminent's Fontaine	27	2	Grand Duke ..	6	0
K.C.B.	26†	1†	Mabel's Dairyman ..	6	0
Roberts	19	2	Pride of Egmont ..	6	0
Fancy's Lord Twylish	17	2	Hawkesbury Emperor*	5	5
Admiral of Puketapu	17	1	Hawkesbury Black Prince*	5	5
Sunflower's Perseus..	12	3			
Bilberry's Goddington	12	0	Gavotte's Hero* ..	5	4
Golden Swan ..	11	4	Maid's General* ..	5	3
Campanile's Sultan ..	10	0	Lord Nelson* ..	5†	2
Rainbow	9	3	Belvedere Jersey Boy*	5	3
Soumise Majesty ..	9	2	Juno's Laddie ..	5	2
Charm's Lord Twylish	9	2	Oakvale's Red Line	5†	1
M.L.C.	9	0	Peggy's Campanile ..	5†	1†
Rozel's Sultan ..	9	0	Starlight II ..	5	1
Starbright ..	9	0	Golden Fox II ..	5	1
The General ..	9	4	Mona's Campanile ..	5	1
Lady Duke* ..	9†	6†	The Squire (1272) ..	5	1
Sultan's Disdain* ..	8†	6	Silver King (Stuckey's)	5	0
Noble Twylish ..	8	4	M.H.R.	5	0
Renown of Meadowbrook	8	4	Lord Lepperton ..	5	0
			Miro Meadows Star*	4	4
Farleigh Fox ..	8	3	Black Swan* ..	4	4
Lord Twylish ..	8	2	Genoa Nelson Chase*	4	3
Frisky Campanile ..	8	1	The Owl's Victor* ..	4‡	2†
Heather Boy ..	8	0	Senor*	4	2
Petune's Noble ..	7†	3†	Sweet Fox of Collingwood*	4	2
Exile of Oaklands ..	7†	2			
Good Luck ..	7	2	Charm's Lord* ..	4†	2†
Bush Boy ..	7	1	Flower Boy II* ..	4	1
Brighton Twylish ..	7	1	Lord Maitland* ..	4	1
Mermaid Sultan ..	7	1	Melia Ann's Sultan*	4†	1
Molina's General ..	7	1	Silver Conqueror* ..	4	1
Stevenson ..	7	1	Fancy's Carnation's Fox	4	0
Sunlight's Noble General	7	0	Glory	4	0
Goddington ..	7	0	Knight Commander	4	0
Blizzard	7	0	Nestor of Willowbank	4	0
Belvedere Sun Prince*	6	3	Silverlock's Duke ..	4	0
Belvedere Bilberry's Last*	6	3	Yankee Sweet ..	4	0
			Young Emperor III	4	0
Belvedere Sunset ..	6	1	Miro Meadow's Maori Boy*	4	3
Marcus	6	1			
Meadowbrook Nobility	6	1	Defender of Meadowvale*	4	4
Oculist XII ..	6	1			

* Qualified during 1921. † Also one second-class-certificate daughter. ‡ Also two second-class-certificate daughters.

MILKING SHORTHORNS.

Class-leaders.

In last year's annual review we drew attention to the subdivision of the two-year-old, three-year-old, and four-year-old Shorthorn classes into junior and senior classes. Not a large number of certificates has been issued to this breed during the past year, and it will therefore scarcely be expected that many of the class-leaders of 1920 have been displaced. Two classes have new leaders—the junior two-year-olds and the mature class.

The 1920 leader of the junior two-year-olds was in reality only a yearling when she commenced her test and finished with a credit of 318·3 lb. fat. The new class-leader, Peach Grove Lady Dinah II, commenced at almost two and a half years of age, and raised the class maximum by 112·44 lb. fat to 430·74 lb. This is a splendid increase, and brings the production of the class-leader of the two-year-olds more into harmony with the yields of the other leaders.

In the mature class Willowbank Beauty has been replaced as leader by Maniaroa Princess with a record which brings the new leader into the 700-lb.-butterfat class. Maniaroa Princess certainly looks the part, and in our opinion shows splendid dairy type.

The list of class-leaders for the past year stands as follows :—

Name of Cow and Class.	Tested by	Age at starting Test.	Fat req'd. for Cert.	Yield for Season.		
				Days.	Milk.	Fat.
Junior Two-year-old.		Y. dys.	lb.		lb.	lb.
Peach Grove Lady Dinah II	W. J. Slack, Otaki Railway	2 180	258·5	365	9,458·8	430·74
Senior Two-year-old.						
Birkland Dainty ..	G. N. Bell, Palmerston North	2 281	268·6	365	11,616·9	459·98
Junior Three-year-old.						
Matangi Nancy ..	Ranstead Bros., Matangi	3 9	277·9	365	10,795·4	399·63
Senior Three-year-old.						
Terrace View Rosy II	T. De la Haye, Ngaawapurua	3 360	313·0	365	13,270·8	577·00
Junior Four-year-old.						
Matangi Jewel ..	Ranstead Bros., Matangi	4 6	314·1	365	12,524·4	509·45
Senior Four-year-old.						
Matangi Strawberry II	Ranstead Bros., Matangi	4 351	349·6	365	12,774·6	473·50
Mature.						
Maniaroa Princess ..	Ranstead Bros., Matangi	*	350·0	365	15,951·7	700·76

* Mature.

Class-averages.

It is possibly somewhat of a misnomer to apply the term "class-average" to each of the classes indicated below, inasmuch as in four

of the seven classes only one animal competed. The junior two-year-old and mature classes show an increase in the production of the average cow, and these increased credits have been accounted for by the new class-leaders.

The class-averages stand for 1921 as follows:—

Class.	Number of Cows.	Average Yield for Season.		
		Days in Milk.	Milk.	Fat.
	1921.		lb.	lb.
Junior two-year-old ..	3	365	7,700·7	352·81
Senior two-year-old ..	1	365	7,674·4	329·46
Junior three-year-old ..	3	313	7,836·3	291·72
Senior three-year-old ..	1	327	9,459·0	381·85
Junior four-year-old ..	1	356	10,845·3	392·53
Senior four-year-old ..	1	298	8,695·0	338·51
Mature	27	350	11,342·2	452·84
	1920.			
Junior two-year-old ..	4	360	6,540·2	275·46
Senior two-year-old ..	2	352	10,557·1	419·45
Junior three-year-old ..	3	365	10,028·4	380·87
Senior three-year-old ..	1	365	13,270·8	577·00
Junior four-year-old ..	2	365	11,651·5	497·91
Senior four-year-old ..	1	365	12,057·0	427·59
Mature	48	340	11,591·5	449·10

MANIAROA PRINCESS (RANSTEAD BROS., MATANGI).

Leader of the Milking Shorthorn mature class (see table, page 141).

AYRSHIRES.

Class-leaders.

There are a few enthusiasts among the Ayrshire breeders who believe, and rightly so, that there is a place for their favourite breed among the high-producing dairy cattle of New Zealand. We would like to see the breed represented by a number of breeders which would, in comparison with the other dairy breeds, do the Ayrshire justice.

The list of class-leaders has not been changed this year, and stands as follows :—

Name of Cow and Class.	Tested by	Age at starting Test.	Fat req'd for Corr.	Yield for Season.		
				Days.	Milk.	Fat.
		Y. dys.	lb.		lb.	lb.
Two-year-old.						
Greenfields Sprightly II	C. E. C. Webb, Koputaroa	2 335	274·0	365	13,598·6	507·87
Three-year-old.						
Greenfields Ina ..	C. E. C. Webb, Koputaroa	3 345	311·5	365	13,958·3	566·02
Four-year-old.						
Alexandra of Waipapa	F. Mills, Waipapa, Hawera	4 348	348·3	365	14,348·6	591·16
Mature.						
Milkmaid of Springview	A. H. Hansen, Te Rehunga	5 349	350·0	365	12,826·2	600·21

Class-averages.

The eleven Ayrshire cows which received certificates during 1921 represent only three of the four classes into which the animals are usually subdivided, consequently a table of averages cannot be given.

Four of the records fell in the two-year-old class, and these are credited with an average production in 332 days of 8,885·30 lb. milk containing 343·16 lb. fat. In the four-year-old class two cows average 9,000·20 lb. milk containing 351·77 lb. fat, with an average lactation period of 315 days. Five mature cows gained certificates, on an average yield of 389·47 lb. fat from 9,522 lb. milk in 326 days.

C.O.R. Bulls.

Records made during the year entitle another Ayrshire bull to a place on the C.O.R. list. We refer to Dominion Netherton Good Bonus (imp.), who has five C.O.R. daughters. The only other C.O.R. bull on the Ayrshire list is King Cole, who qualified during the 1914–15 season, and now has five certificated daughters to his credit, among which are two productions of over 500 lb. fat.

Dominion Netherton Good Bonus was imported from Scotland late in 1911 by the New Zealand Government. He was bred by Mr. Thomas Clement, Netherton, Newton Mearns, and was selected for the Department of Agriculture by Mr. Dunlop, one of the commission of Scottish farmers who visited Australia, and who extended his journey to New Zealand. The five certificated daughters of Dominion Netherton Good Bonus are credited with an average yield of 351·33 lb. fat in 315 days. This must be considered very satisfactory when the fact that the records were made under practically ordinary herd conditions is taken into account.

RED POLLS.

At the commencement of the present season the recently formed New Zealand Red Poll Cattle Breeders' Association joined the ranks of those associations which have been co-operating with the Dairy Division in the certificate-of-record testing. As yet the only registered Red Poll cows placed under purebred test have been the property of the New Zealand Government, at the Central Development Farm, Weraroa. These animals were among a number which the Department of Agriculture imported from Australia in 1918, and those eligible were entered for test immediately on their arrival in the Dominion. The records of the animals which have qualified for certificate are here appended :—

Name of Cow and Class.	Age at starting Test.	Fat required for Certificate.	Yield for Season.		
			Days.	Milk.	Fat.
Two-year-old.	Y. dys.	lb.		lb.	lb.
Neutral	2 322	272·7	365	9,680·75	418·55
Lucky Hit	2 286	269·1	318	8,225·25	357·66
Riverina	2 306	271·1	342	7,070·50	354·48
Melanesia	2 334	273·9	317	6,755·75	294·46
Concertina	2 305	271·0	328	6,100·50	271·66
Three-year-old.					
Gold Top	3 302	307·2	365	9,491·25	459·46
Lucky Hit	3 240	301·0	346	7,881·70	359·66
Matanza	3 38	280·8	365	8,904·75	344·00
Uralia	3 47	281·7	351	8,202·25	342·20
Neutral	3 342	311·2	334	7,317·95	323·90
Orange	3 117	288·7	365	6,556·25	306·54
Algeria	3 161	293·1	320	7,761·50	303·16
Four-year-old.					
Opticia	4 343	349·3	365	9,958·50	441·27
Matanza	4 74	320·9	306	7,770·75	334·33
Mature.					
Sylph	5 4	350·0	365	11,009·00	505·84
Opticia	6 91	350·0	337	10,606·50	468·51
Gold Top	5 20	350·0	325	8,656·10	428·42
Sylph	6 41	350·0	350	8,930·80	382·24
Matanza	5 94	350·0	346	8,762·60	361·99

APPRECIATION.

As in the past, we owe a good deal to the help of the secretaries of those cattle-breeders' associations co-operating with the Dairy Division in connection with the certificate-of-record testing. The increased entries for purebred testing has given them more work. We have always found them courteous and willing to lend all assistance possible, and we desire to record our hearty appreciation of their assistance

CLOSING LIST OF RECORDS FOR 1921.

The appended list completes the publication of records of all certificates issued during the calendar year 1921. Several of the records are of above average merit, but space will not permit of any comment upon these.

CLOSING LIST OF RECORDS.

Name of Cow and Class.	Tested by	Age at starting Test.	Fat req'd. for Cert.	Yield for Season.		
				Days.	Milk.	Fat.
		FRIESIANS.				
Junior Two-year-old.		Yrs. dys.	lb.		lb.	
Minnie Brundee of Oakview	H. R. Green, Kairanga	1 361	240·5	364	9,779·25	400·65
Senior Two-year-old.						
Maidie of Willowburn	R. J. Potter, Pukerau	2 362	276·7	365	16,940·0	551·13
Junior Three-year-old.						
Cluny Colantha Pontiac II	Cluny Friesian Farm Co., Wellington	3 98	286·8	341	9,042·1	294·54
Senior Three-year-old.						
Bainfield No. 20 ..	W. D. Hunt, Invercargill	3 234	300·4	365	14,259·9	606·99
Mature.						
Cordyline Lyra ..	R. J. Potter, Pukerau	7 62	350·0	365	17,186·2	611·73
Ashlea Johanna ..	J. Liggins, Tokomaru	7 4	350·0	250	11,141·6	394·73
Clothilde Alcartra Fayne	A. W. Chapman, Gordonton	5 1	350·0	347	11,695·8	367·98
		JERSEYS.				
Junior Two-year-old.						
Valda	Mrs. Spinley, Palmerston North	1 293	240·5	365	8,014·6	4 37·78
Middlewood's Joy ..	H.G.Livingston, Kiwitea	1 309	240·5	365	6,704·2	417·79
Disturbance ..	F. Hoskin, Matapu ..	2 7	241·2	360	6,590·5	349·73
Aberbrothock's Beauty	W. H. Fitness, Rehia	2 28	243·3	365	6,382·7	345·13
Princess Irene ..	H. H. Buxton, Hawera	1 329	240·5	329	5,971·3	335·45
Best of All ..	H. H. Buxton, Hawera	2 42	244·7	276	6,338·1	330·52
Dairyman's Gem ..	J. S. Jones, Bell Block	1 354	240·5	365	5,559·1	314·92
Sultana's Duchess ..	E. B. Eagle, Greytown	2 16	242·1	365	6,726·9	312·74
Dame of the Order ..	C. H. Weston, New Plymouth	2 11	241·6	365	5,261·7	308·24
Cicero's Hope ..	H. H. Buxton, Hawera	2 0	240·5	334	5,348·6	306·43
Miro's Goldie ..	C. H. Weston, New Plymouth	2 43	244·8	365	5,269·7	304·00
Belvedere Joyful ..	E. B. Eagle, Greytown	2 10	241·5	365	5,928·4	302·13
Sungleam's Aster ..	E. B. Eagle, Greytown	1 334	240·5	365	5,646·6	292·73
Lady Hillview ..	R. K. Garland, Oakauia	2 19	242·4	239	5,642·5	292·26
Christmas Box ..	C. H. Weston, New Plymouth	1 305	240·5	365	4,758·2	280·54
Lady Charm ..	H. H. Buxton, Hawera	1 352	240·5	326	5,582·1	276·77
Belvedere Thistle Mimosa	E. B. Eagle, Greytown	1 327	240·5	365	5,190·1	258·15
Maori Dolly ..	C. H. Weston, New Plymouth	1 346	240·5	365	4,578·2	255·99
Belvedere Bilberry Daisy	E. B. Eagle, Greytown	1 333	240·5	364	4,595·5	245·27
Dominion Goldfern..	Ruakura Farm of Instruction, Hamilton	1 250	240·5	365	3,782·9	240·94
Senior Two-year-old.						
Black Bud ..	C. H. Weston, New Plymouth	2 361	276·6	365	6,136·4	350·11
Miro's Gem ..	C. H. Weston, New Plymouth	2 325	273·0	365	5,230·2	333·98
Climax ..	W. McGowan, Papatoetoe	2 208	261·3	323	6,017·8	295·55
Asterina ..	J. Kelso, Hamilton ..	2 155	256·0	306	5,307·7	287·76

CLOSING LIST OF RECORDS—*continued.*

Name of Cow and Class.	Tested by	Age at starting Test.	Fat req'd. for Cert.	Yield for Season.		
				Days	Milk.	Fat.
	JERSEYS—*continued.*					
Three-year-old.		Yrs. dys.	lb.		lb.	lb.
Nelly Mahone ..	C. Stevens, Maungatapere	3 344	311·4	365	8,863·7	477·93
Oakvale's Echo ..	R. L. Parkin, Fitzroy	3 27	279·7	365	7,307·5	444·93
Pride's Maid ..	F. Hoskin, Matapu ..	3 3	277·3	280	6,140·0	359·28
Four-year-old.						
Bilberry's Gem ..	W. Pollock, Stratford	4 42	317·7	286	7,803·1	461·05
Aberbrothock Queen	A. R. Valder, Arapohue	4 24	315·9	364	7,302·9	406·60
Molina's Prim ..	F. Hoskin, Matapu ..	4 335	347·0	280	7,078·0	401·59
Tiny Kura ..	C. H. Weston, New Plymouth	4 71	320·6	365	6,013·1	360·77
Mature.						
Te Arei's Winsome ..	W. R. Hopcroft, Akautere	7 7	350·0	365	7,555·9	578·48
Biddy Mahone ..	C. Stevens, Maungatapere	7 69	350·0	365	9,331·3	507·41
Oakvale's Arabella	R. L. Parkin, Fitzroy	6 364	350·0	356	9,289·8	503·79
Duchess of Fern Grove	H. Purdie, Waitara ..	9 47	350·0	322	9,133·5	500·33
Briar Lady ..	H. H. Buxton, Hawera	6 319	350·0	345	8,517·1	440·73
Waipiko Girl ..	A. R. Valder, Arapohue	8 2	350·0	365	8,809·2	426·52
Mountain View's Flo	A. R. Valder, Arapohue	6 357	350·0	365	8,242·0	425·57
Ivondale's Carnation Queen	P. J. Petersen, Waitara	5 355	350·0	304	6,848·6	357·82
Mountain View's Kohia	F. Hoskin, Matapu ..	5 350	350·0	285	5,904·9	352·54
	MILKING SHORTHORNS.					
Mature.						
Greenfield Rose ..	H. Campbell, Matangi	..	350·0	365	12,941·7	458·97
	SECOND-CLASS CERTIFICATES.					
	FRIESIANS.					
Senior Two-year-old.						
Cadilac Friesland Queen	A. S. Elworthy, Timaru	2 236	264·1	365	13,322·1	429·72
Junior Three-year-old.						
Cluny Hope III ..	Cluny Friesian Farm Co., Wellington	3 158	292·8	354	11,039·4	428·73
Mature.						
Gordon's Valley Lady Domino	A. S. Elworthy, Timaru	6 320	350·0	365	15,386·5	580·79
	JERSEYS.					
Junior Two-year-old.						
Squire's Vanity ..	J. Nicolson, Kaupokonui	2 17	242·2	365	8,470·0	465·62
Lady Twinkle ..	E. B. Eagle, Greytown	1 359	240·5	365	6,397·3	383·64
Spotswood Tiny ..	W. H. Jury, New Plymouth	1 218	240·5	365	7,055·5	357·67
Senior Two-year-old.						
Neat Owlette ..	S. R. Lancaster, Palmerston North	2 349	275·4	365	6,896·5	403·92
Mature.						
Lady Ethel ..	W. H. Miers, Rukuhia	10 346	350·0	365	10,369·1	540·91
	MILKING SHORTHORNS.					
Mature.						
Hukerewai Midget ..	A. D. Bell, Clevedon..	6 330	350·0	365	11,861·0	454·03

THE GRASSLANDS OF NEW ZEALAND.

PRINCIPLES OF PASTURE ESTABLISHMENT.

(Continued.)

E. BRUCE LEVY, Biological Laboratory, Wellington.

3. STEEP UNPLOUGHABLE FOREST COUNTRY.

THE hilly wooded country in New Zealand comprises forest of many types, according to the nature of the soil and climate. Each of these types really calls for special consideration, but many basic principles relating to their conversion into grassland apply to all of them.* A study of the original forest cover is an essential, for the type of natural cover that a soil supports is a sure index of the nature and quality of the land, and hence one of the best guides upon which to base the seed-mixture that will be most successful. Southern-beech (*Nothofagus*) or totara (*Podocarpus totara*) country, for instance, is quite a different proposition to tackle compared with forest of the kamahi (*Weinmannia racemosa*), tawa (*Beilschmiedia tawa*), or rimu (*Dacrydium cupressinum*) type.

Whatever type it is necessary to grass it may be accepted as a general truth that the sowing once done is done for always, for never again, comparatively speaking, will there be opportunity for establishment to equal that afforded by the ashes of the original burn. This is the one golden opportunity, and if the seed can be sown even while the ashes are yet warm a good seed-bed and cover is assured.

There are exceptional types, however, where the original burn does not afford these ideal conditions. The most notable of these types are in the wet southern-beech forest lands and in the wetter forest country generally, where not only is it difficult to get a clean first burn, but the forest-floor is usually matted with mossy growth which does not burn properly when the clearing is fired. In the case of the wet southern-beech forest usually the humus of the forest-floor is left unburnt, and this may be a foot or so deep. With these types, then, a loose peaty seed-bed is present, and similar conditions must be recognized, so far as plant-establishment is concerned, to those met with in the peat swamps. Consolidation must be effected, and it would appear that the only thing to do is to sow the area down with quick-establishing and deep-rooting plants such as Italian rye-grass, red clover, Lotus major, Yorkshire fog, &c., to ensure consolidation, and then rely on getting in the more permanent species later or in the second clearing-up burn. This practice needs carefully working out

* The writer takes this opportunity to explain that he is no advocate of the indiscriminate clearing of forest on steep broken country for grassing purposes. He is in sympathy with the view (now happily gaining ground) that a large proportion of such country would, for various considerations, be better preserved in its native state. It seems inevitable, however, that considerable areas of hilly bush country must still be cleared for settlement purposes, and, such being the case, it is of vital importance that the conversion to grassland should be effected on the best lines. The purpose of the present article is to assist in that direction.

FIG. 37. A BAD BURN ON FAIRLY WET RAIN-FOREST LAND.

Water-fern has occupied the whole of the soil wherever the surface was protected by unburnt fellings.

FIG. 38. A WELL-GRASSED BUSH-BURN COMPRISED MAINLY OF COCKSFOOT, CRESTED DOGSTAIL, POA PRATENSIS, AND WHITE CLOVER.

While the feed is present there is no danger of a weed succession such as in Fig. 39.

before it can be definitely recommended to farmers, but there seems little hope that the ordinary permanent grass-mixtures will be successful when sown on these loose, unconsolidated, peaty surfaces.

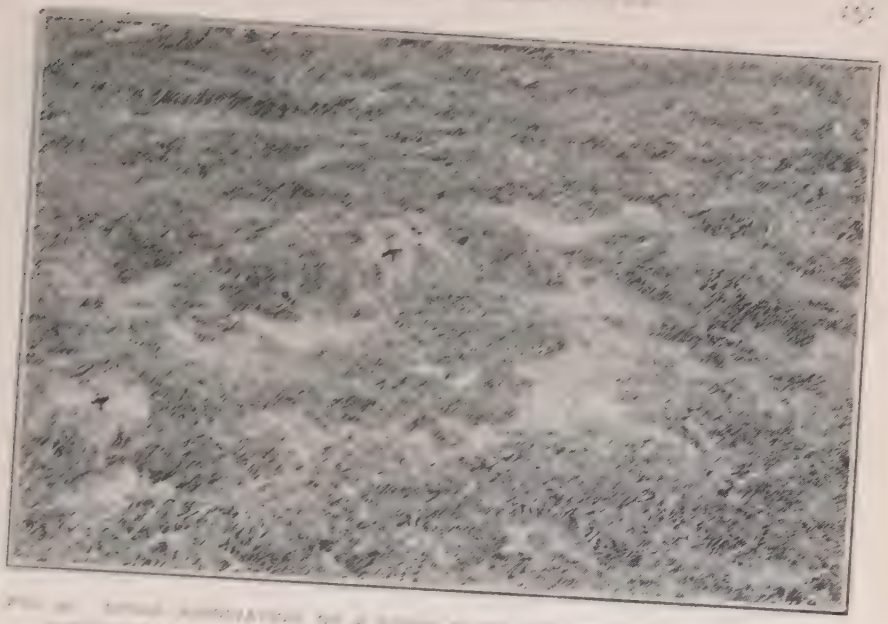
In the burning of all types of forest one has to ward against the possibility of a bad burn (Fig. 37), else the whole area may run immediately to water-fern (*Histiopteris incisa*), wineberry (*Aristotelia racemosa*), or tree-fuchsia (*Fuchsia excorticata*). One has to so regulate the sowing and subsequent farm-management that undesirable types of vegetation such as bracken-fern (*Pteridium esculentum*), hard (or silver) fern (*Pteris scaberula*), piripiri (*Acaena Sanguisorbae*), foxglove (*Digitalis purpurea*), tauhinu (*Cassinia leptophylla*), manuka (*Leptospermum scoparium*), blackberry (*Rubus fructicosus*), wineberry, tree-fuchsia, &c., do not come in. One must realize that such vegetation will come in unless a sufficiency of grass is produced to enable stock to be maintained on those areas to deal with any reappearing fern, &c. So long as the area supports stock in fair numbers there is little danger of replacement by the undesirable plants mentioned (Fig. 38). The supply of feed must be continuous from a very early period after burning, and particularly so if the burn has been an early autumn fern-burn. Temporary elements—Italian rye-grass and red clover—must be included in the seed-mixture so that early stocking may be done when the fern is in the curl stage, at which stage it is most vulnerable. Too much purely temporary feed, however, should be avoided, and the prime object of producing such feed should be the provision of a competitor for any rapidly reappearing undesirable vegetation, so that the area may be stocked when such weed-growth is most easily destroyed. If the likelihood of such vegetation coming in is small (for example, on a good clean burn), then the temporary elements should be correspondingly reduced. The temporary elements of the mixture, therefore, must be looked upon more as a weed-controller than as a feed-producer. This may appear a sweeping statement in view of the general practice of producing rapidly-growing feed on new bush-burns. To the bush-burn-country farmer the new burn is almost synonymous with the temporary pasture of the arable farmer. Rapid temporary feed is produced which runs out after a few years, leaving the way open for weed invasion when the short-lived plants that were used have run out.

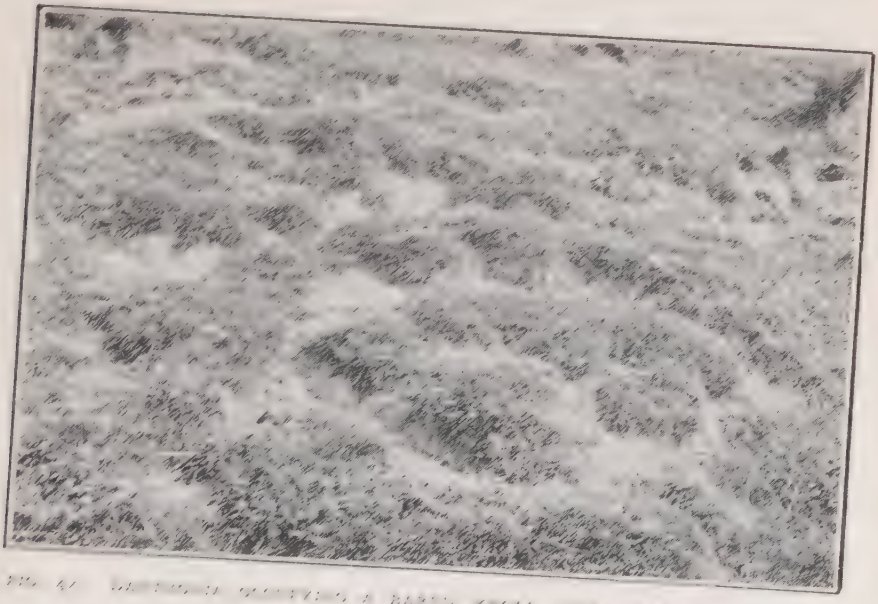
The fact that comprised in the occupied land of New Zealand to-day are some $3\frac{3}{4}$ million acres of fern, scrub, and second growth testifies to the unsoundness of this practice. It is mainly to the sowing of plants that will not hold for more than a few years that so much fern invasion has come about (Fig. 39). The method of sowing down with a lot of temporary elements in the mixture is cheap and productive of a large bulk of rapid feed, but the final results do not justify this "flash in the pan" system of grassing our steep bush-burn country. Not an acre of the $4\frac{1}{2}$ million acres of still standing virgin forest, if required for grassing, should be allowed to go through the unproductive fern and second-growth stage. In the seed-mixtures more and more consideration must be given to those species of grasses and clovers which will be truly permanent, such as cocksfoot, crested dogstail, timothy, paspalum, danthonia, Poa pratensis, red-top, Waipu brown-top, and Chewings fescue. Perennial rye-grass has demonstrated again and again, under present-day farm practice, its inability to hold

FIG. 39. FERN AND BLACKBERRY TAKING CHARGE OF A RECENT BUSH-BURN SOWING.

A portion of the 3¾ million acres of fern, scrub, and second growth

FIG. 40. A CLOSED ASSOCIATION OF COCKSFOOT POA PRATENSIS, AND WHITE CLOVER ON EXTREMELY STEEP COUNTRY, FORMING AN IDEAL TURF AND WHERE THE DESICCATING FORCES AT WORK HAVE LITTLE INFLUENCE.





formed by gradual outspreading, of which

on the greater portion of our steep bush-burn lands. It cannot therefore be looked upon as a permanent constituent of such grasslands, and hence it should not be used to the exclusion of the permanent species just cited. Nevertheless its inclusion in the mixture is very important indeed, because most of the truly permanent elements are slow to establish, and consequently would be in danger of being swamped out by fern and foreign growth if sown by themselves.

The growth-forms of certain of our pasture-plants must also be considered. Certain of those species which it is hoped to maintain there, particularly cocksfoot and crested dogstail, are more or less tussock-forming plants. When they do tussock they become exposed and work their way out of the ground, or are readily pulled or knocked out by stock. Particularly is this true of cocksfoot, and the objective should be to use other species of grasses as companion plants that will bind the surface in a continuous sole and thus keep these tussocks from becoming exposed (Fig. 40). Poa pratensis, for example, is used mainly for this purpose—really more for its mechanical action in binding the turf than for the actual amount of feed it produces. Bare ground appearing on the hillsides is a very much worse feature than on the flat country. The effect of the wind is greater; soil-creep, in which the loose soil-particles are ever moving to lower levels, is a potent factor; stock grazing are more damaging with their feet; and establishment by reseeding is more difficult on the moving slope. Thus when bare spaces appear the factors working have greater sway than on the level lands. Plants like cocksfoot that are there become exposed and die or are pulled out (Fig. 41), and as each goes out the breach is widened more. To fill the gaps on such locations plants of a tillering nature must be used, and this is where danthonia excels as a bare-ground coverer. It spreads not so much in virtue of its seeding attribute, but by means of its short tillering rootstock (Fig. 42).

It will thus be seen that as regards seed-mixtures the species that will hold naturally on the various types of country, and those that will bind the turf and tiller out to occupy any bared ground, are undoubtedly the most important to consider; it has been through failing to employ these that so much of our steep country has run to fern, &c. Yet, even though it be common knowledge what species should be sown, the factor naturally enters as to the ability of the farmer to provide the funds necessary to grass with the species of grasses that he knows will hold. Perennial rye-grass is so cheap, and the rapid feed it gives is so very enticing! The seed of the grasses that will hold are often very expensive, and at the present time, in drawing up formulas for these types of country, the question of the expense is a very great hindrance to recommending that mixture which would be the most likely to give the desired permanent turf. The farmer who tackles this type of country and who employs the costly mixture will not get the same immediate returns as if he sowed mainly rye-grass, but it is only a matter of a few years when the extra expense on the mixture will be fully recouped. It is wiser to fell and sow a smaller area on sound lines than a larger area with cheaper and quicker-producing but less suitable species.

Farm-management must play a more and more important part once the sward of grasses is established. A single example will serve to show how the grass cover will change on the one type of country under

FIG. 43. HILLSIDE AT AKAROA, SHOWING EFFECT OF MANAGEMENT ON GRASS COVER.

(*a*) Pure cocksfoot seed-crop area, unstocked; (*b*) paddock of cocksfoot and white clover; (*c*) paddock hard-grazed and running into catsear, &c.; (*d*) almost pure sward of danthonia; (*e*) recent forest-burn going into fern.

FIG. 44. COUNTRY HEAVILY STOCKED WITH SHEEP AND CARRYING A TURF ALMOST OF PURE DANTHONIA (WELLINGTON DISTRICT).

The whole hillside is virtually free of weeds.

different systems of management. Fig. 43 shows a hillside at Akaroa where within a comparatively small area many phases of a transition in the grass cover from pure cocksfoot to pure danthonia may be seen —all induced by the method of utilization of the herbage produced. Where the areas have been reserved year after year for a seed-crop and where no stocking has been carried out pure cocksfoot-stands still persist (see "*a*" on photo). Where seed-harvesting combined with winter grazing has been carried on white clover has come into the crop and an excellent cocksfoot-white-clover pasture has been formed (*b*). Where hard grazing has been carried on for six or more years (*c*) the cocksfoot is going out, bare ground has appeared, and such plants as rib-grass, catsear, and field-daisy are coming in, while on the barest and most open knolls danthonia is just making its appearance. Where grazing has been carried out continuously for upwards of fifteen or more years the whole pasture has run into an almost pure danthonia sward, a little cocksfoot still remaining in the more sheltered portions (*d*). On this type of country, capable of carrying a good cocksfoot-clover sward, such transition to danthonia must be regarded as undesirable; but it must be firmly borne in mind that had the danthonia not come in to take up the running the whole area would have reverted to fern, as has been the case with much adjoining land on the Akaroa slopes that have more recently been brought in from forest (*e*). Here apparently the cocksfoot cover was not secured in the first place, and therefore the conditions for fern invasion were so favourable that it came in before the danthonia could become established.

On these steep slopes danthonia forms without doubt one of the most stable successions, and if the farmer is content simply to stock his paddocks, irrespective of the demands of efficient farm-management, then the safest grass he can employ is Danthonia pilosa (Fig. 44). There is little question that to-day this grass occupies a greater area of steep unploughable country than do all other grasses put together, excepting the native tussock grasslands. In the Auckland District paspalum should play a very much more important part on the steep country. The mere fact that paspalum—a palatable plant—will hold and spread places it in the fore-rank of grasses for such locations. In farming on steep country more and more reliance must be placed on plants naturally imbued with power to occupy those soils and to persist there (Fig. 45). It is in virtue of these powers that danthonia holds such sway, and not so much by the wish or will of the farmer.

With regard to this danthonia succession it may seem strange to say that danthonia itself is no warrior so far as opening an attack is concerned. It will not establish itself and prove aggressive while the ground is occupied by a turf of other grasses that are thriving there; in other words, it will not enter a closed association (compare Fig. 43). But after the conflict of other species, when the remnants are weakened and show signs of declining endurance, danthonia begins its modest task of repopulation, and, with that consistency that marks the plodder, gets hold of the ground in such a fashion that very few plants would be successful in ousting it from that location. Therefore whenever a farmer sees his paddocks running into danthonia he may be firmly convinced that the sward of other grasses is weakening and opening up. The explanation is that danthonia is not a shade-endurer and cannot stand a cover of other grasses.

FIG. 45. PASPALUM DEMONSTRATING ITS ABILITY TO HOLD AND TO KEEP OUT FERN, ETC., ON STEEP COUNTRY IN NORTH AUCKLAND.

FIG. 46. SHOWING EFFECT OF LIGHT STRAW COVER IN PREVENTING THE WASHING-DOWN OF ASH AND LEAVES.

Note the leaf and ash dam at point in middle marked x. The cover also keeps the soil surface cool and moist.

To modify the environment of these hillside grasslands so that more tender species than danthonia, paspalum, red-top, &c., will persist is often impracticable, and there seems little doubt that it is wise not to attempt to pamper up unsuitable species, but to get the most possible out of those most fitted to survive there, or, in other words, to exploit the fittest. In farm economy the exploitation of the fittest must be regarded as an axiom.

From the foregoing it will be seen that not only is the selection of the right species important, but that the treatment, once establishment has taken place, is equally so. Skill must be brought to bear, for serious mistakes made on this type of country cannot be remedied by the plough as on the more level land. Once they are made the area must revert to fern and foreign growth, and remain in that cover until such time as the area may again be fired and a fresh seed-bed thus secured.

One other principle in grassing steep country is worthy of mention, and particularly on those burns where the cover was light and where but a small quantity of ash remains—such, for example, as a manuka-scrub burn. The failure so often resulting with surface sowing of manuka-scrub land is due to the fact that the surface is unprotected, and that the leaves, ash, &c., are readily dried out or washed down the slope. It is surprising the staying-effect that a very slight strewing of straw on to the burnt surface has in the prevention of this washing-away and in the conservation of moisture at the surface where it is needed (Fig. 46). The principle involved is a very sound one as far as plant-establishment is concerned, although in practice it may be generally difficult to transport the straw on to such areas. The cheap rate ruling for danthonia-seed last year, after many farmers had cut but not threshed, led to the adoption of this practice on several manuka-scrub burns in North Auckland. When some of these were examined by the writer in March last germination had not taken place, but the effect of moisture-conservation and staying of ash from washing down was very noticeable; moreover, if seed additional to the danthonia straw had been sown the chance of establishment of the grass would have been greatly enhanced. In early autumn burns also the effect of shade from logs, &c., is very marked (Fig. 47). In the shade of these there is often a splendid strike of grass, whereas on the open sunny knolls, if the autumn has been a dry one, the grass may entirely fail to take, and when rains fall these portions are almost certain to become occupied by water-fern, catsear, or other weeds (Fig. 48). This brings up the question as to what is the best time to burn, and as far as actual plant-establishment is concerned there seems little doubt that the later in the autumn the burn can be safely left the better.

SEED-MIXTURES.

With reference to seed-mixtures and the class of seed to sow, a general mixture somewhat as follows should give good results on the better class of hillside forest burn: Cocksfoot, 10 lb.; perennial rye-grass, 8 lb.; Italian rye-grass, 4 lb.; crested dogstail, 4 lb.; timothy, 2 lb.; Poa pratensis, 2 lb.; Danthonia pilosa, 2 lb.; red clover, 2 lb.; white clover, 2 lb.; Lotus major, ½ lb.: total, 36½ lb. per acre.

For poorer country the following may be suggested: Cocksfoot, 6 lb.; perennial rye-grass, 6 lb.; Italian rye-grass, 4 lb.; crested dogstail,

FIG. 47. PORTION OF A RECENT BURN, SHOWING EFFECT OF SHADE ON TAKE OF GRASS, ETC.

To right and left will be noted grass and turnips, and in the middle an open sunny area where the sowing has entirely failed.

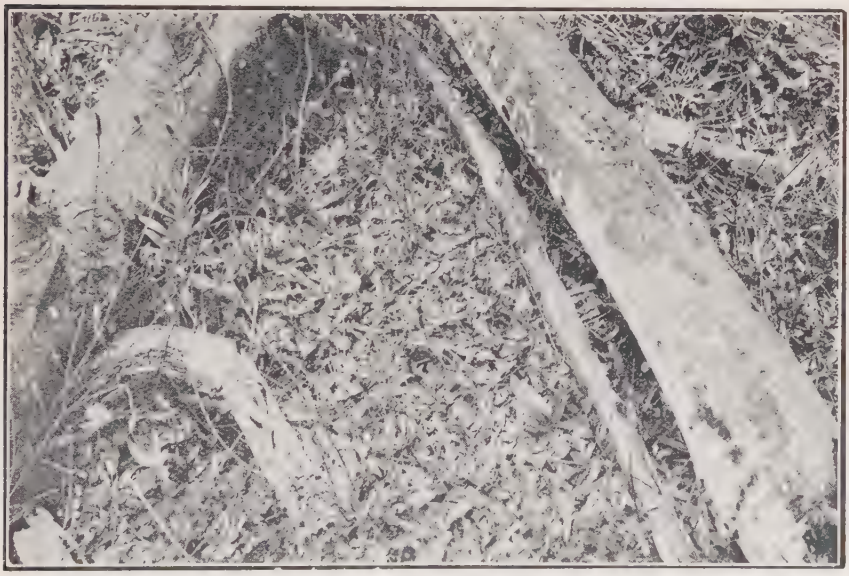


FIG. 48. A YEAR-OLD BURN, SHOWING A DRY FACE SIMILAR TO THAT IN FIG. 47, WHERE CATSEAR HAS COME IN AND FORMED A PURE ASSOCIATION.

4 lb.; red-top or Waipu brown-top, 1 lb.; Poa pratensis, 1 lb.; Chewings fescue, 3 lb.; Danthonia pilosa, 3 lb.; white clover, 2 lb.; red clover, 1 lb.; Lotus hispidus, 2 lb.; Lotus major, ½ lb.: total, 33½ lb. per acre.

On dry rocky faces almost pure sowings of Chewings fescue or red-top with a little clover may give the best results. On wet peaty surface, as before mentioned, rye-grass, Yorkshire fog, and Lotus major are the most likely to be successful. It will be seen, however, that in dealing with this type of country in a general way specific mixtures for all types of country cannot be given, and the foregoing are at best a guide as to those species which are the most likely to hold and to give a permanent turf.

It would almost seem imperative that on almost every burn two mixtures at least should be used—that for the hollows and better soils being composed mainly of those species in the first-mentioned mixture, and that for the knolls and drier parts those specified in the second mixture. The writer is fully aware that this method means extra work in the sowing, but to sow large quantities of cocksfoot, rye-grass, timothy, &c., on dry knolls is simply throwing away good seed.

Too much stress cannot be laid on the fact that only good seed should be sown. Apart from the fact that "cheap" poor seed, when calculated at cost per living seed, is always expensive, it must more and more be realized that such seed is being sown on to country which cannot be renewed as can level ploughable lands, and, realizing this, every opportunity should be seized upon to make the initial sowing a success. Certain seed firms in the Dominion fail to realize the significance of this fact, and by advertising poor cheap mixtures for "rough country," as they term it, are placing in the hands of the unwary farmer material for his undoing.

NOSEMA APIS IN NEW ZEALAND.

An investigation recently carried out by Mr. R. Waters, of the Biology Section of the Department, has shown that the organism *Nosema apis* Zan. is not uncommon in the intestine of adult bees in the Auckland District. This organism has been credited with being the cause of certain bee-diseases in various parts of the world, but there is a considerable amount of doubt as to whether or not it is primarily responsible for any one of them. All that can be said at present is that none of the bee-diseases that from time to time have been currently attributed to Nosema are in any way prevalent in New Zealand apiaries, but Nosema has been found in various portions of the Auckland District in colonies that on outward appearance are quite healthy. So far as the investigation has progressed there is no evidence to show that Nosema is of recent introduction into New Zealand. It would certainly appear as if the presence of the organism is not connected, at least at this time of the year, with any seemingly diseased condition of the colonies. The distribution and effects of the organism throughout New Zealand are being studied, and this should lead to a correct estimate as to whether or not it is likely in any way to seriously affect the interests of local apiarists.—A. H. C.

A VALUABLE FORM OF BARBERRY.

HEDGES IN THE WAIKATO.

W. H. TAYLOR, Horticulturist.

SINCE the publication of the article on "Farm Hedges" in the last November issue of the *Journal* several correspondents have asked for information regarding a species of barberry used as a hedge-plant in certain parts of the Waikato and Thames Valley districts. Investigation has accordingly been made, resulting in the observations here recorded. The most extensive hedges are on the 700-acre property of Messrs. Bowler Bros., about three miles from Matamata. I am indebted to the courtesy of these gentlemen for assistance in the investigation, and in particular to Mr. Edward Bowler, who drove me many miles and enabled me to inspect hedges on other properties in the district, at the same time giving all the information possible.

The plant known as the common barberry is the species planted in most parts of the Dominion, and there are a good many hedges of this plant in the Waikato. One of the characteristics of this plant is the freedom with which fruits are produced. Birds readily eat the fruit, and seeds dropped with their excreta are infesting hilly ground in some districts with a growth that it may eventually cost large sums to eradicate. This factor doubtless influenced the recent addition of common barberry to the Third (optional) Schedule of the Noxious Weeds Act.

The plant which is the special subject of these notes is in general appearance precisely similar to the common barberry. Without close examination no difference can be detected, but so rarely does it fruit that although many miles of hedges were examined I was unable to find a fruit. The plants flower in profusion, but they fail to produce fruit. Lest it be thought that climatic or soil conditions are the cause I may say that the common barberry in hedges divided from the other plant only by a road was in a number of cases carrying heavy crops of fine fruit.

Hedges of the Waikato barberry of various ages from two years to upwards of twenty years from planting were examined. The oldest hedges average from 10 ft. to 12 ft. in height, about 3 ft. through at the bottom, and about 4 ft. at the top, possibly a little more. No trimming whatever has been done at any time. The plants are raised from cuttings in a nursery bed. They are then planted 3 ft. apart in a single row, which is placed under the bottom wire of the fence. Mr. Edward Bowler's experience is that the plants in this position need no other protection from cattle; they are not trodden down, which does occur when the plants are placed clear of the fence. This plan saves double fencing. The plants, of course, grow up on each side of the fence, which remains in the middle to strengthen the hedge. The two lower wires are taken away when the hedge has grown above them; they are not required in the hedge, and are available for use elsewhere.

Another difference between the two species of barberry is the suckering habit of the Waikato plant. Suckers are so freely produced that in a few years the line of hedge is completely closed up and makes an impenetrable barrier. I examined hedges in several places, and a few inches above ground was unable to get my hand through sideways with fingers outstretched. It would appear to be practically impossible for any animal larger than a rat to get through the hedge unless it might be in some place weakened by accident, and I saw no such places. The suckering habit is restricted to a very narrow space; the plant does not produce stolons that break up at a distance. In no place did I see a sucker more than a few inches from the stool, and the suckering habit is thus all to the good—it has no bad points.

RAISING AND PLANTING THE WAIKATO BARBERRY.

As previously stated, the plants are raised from cuttings in a nursery. In the case of the ordinary barberry this would be a somewhat formidable task, but here again the peculiar habit of the Waikato plant is an advantage. Passing along a hedge one sees numbers of strong, straight shoots reaching out from the top. These shoots, one would naturally suppose, started from somewhere near the top, as they would with most plants. In this case they originate from near the base of the plants and make their way right up through the hedge. The shoots are about half the thickness of one's little finger, quite straight, and free from branches. The shoots are whatever height the hedge is, and are easily drawn out when severed at their base. A large number of such rods can be got in a short time. The rods are cut into 7 in. or 8 in. lengths, which are inserted in the ground so as to bury all but the two top buds. The plants are ready the following year to be planted in the hedgerow. In the meantime the only attention required is to keep them free from weeds. I saw several rows of cuttings in Messrs. Bowler's garden—for they are still extending their hedges—and not one cutting had failed to grow. June or July is the time to put in cuttings.

The Bowler brothers are strongly opposed to planting the cuttings in the hedgerow. They point out, as I have myself a number of times, that it is absolutely necessary to keep the soil around cuttings loose and free from weeds until they are well rooted. It is much more economical to do this when they are concentrated in a small space and close at hand than in a long line of hedge, possibly at a distance, where they are sure to be neglected. Experience has shown that when cuttings are so planted losses occur, gaps are left that cannot be satisfactorily filled, and a poor hedge results. While at Matamata I saw an example of such planting. There were numerous gaps in a hedge at least four years old. Cuttings inserted in a nurse-bed become well rooted during the first season, and are ready for planting from late autumn to spring, as may be most convenient. The site of the hedge should be prepared by deep digging some time before planting, so as to expose the soil to the beneficial effects of sun and air.

IDENTITY AND HISTORY OF THE SPECIES.

Some correspondents who have inquired about the plant have referred to it as *Berberis aristata*. I believe this to be incorrect. An authority in my possession describes *Berberis aristata* (a native of

northern India) as similar in appearance to *Berberis vulgaris*, with large blue-green berries, whereas the few berries seen on the special Waikato form of barberry were red. I believe the Waikato plant to be one of the forms of the European *Berberis vulgaris*. The term "*vulgaris*" is applied to a dozen different forms of the type plant. All have yellow flowers, and the fruit is either red, violet, purple, black, yellow, or white. There is also a form that produces seedless berries, except while the plants are young, when they contain seeds. As before stated, in general appearance the Waikato plant is exactly like the barberry that is generally known in this country. The blossoms are yellow, and the rarely seen fruits are red instead of black. The spines of the ordinary barberry point upward or are horizontally placed. On the Waikato plant they point downward at a sharp angle, and without exception. This alone serves to distinguish the plant from the other form. Another difference is the great freedom with which the Waikato plant produces suckers, which causes the formation of an impenetrable hedge. One of the forms of *Berberis vulgaris* bears long sprays of red berries resembling bunches of coral. The spines on this form point downward, but, although the Waikato plant bears red fruit (I myself did not see fruit), I cannot think it is the same, because my experience of the first-mentioned form is that it bears fruit very freely, the sprays being used in floral decorations. The fruit of all forms of *Berberis vulgaris* is used in confections, as well as being pickled while green.

Mr. Edward Bowler informed me that the first-known plant of the Waikato barberry was many years ago growing at Ohaupo. Sir George Grey induced a German family named Karl to settle there. One of these saw the plant, and, being impressed by it, obtained cuttings, and from this plant all the Waikato hedges have originated. The Bowler brothers commenced planting at Te Aroha. Removing to their present locality upwards of twenty years ago, they soon began planting hedges of the barberry around and about their property. Including the Te Aroha plantings, they have established from twenty-five to thirty miles of hedges of this plant. Judging from the hedges seen on these lands I consider it the best farmer's hedge-plant I have observed anywhere, being easily established and requiring no trimming.

OFFER OF CUTTINGS.

The plant can be got by cuttings only. These the Bowler brothers generously offer to give in practically any number to any one who will take the trouble to go and get them. I suggest that it would be worth while for some of the larger landowners in various districts to communicate with Messrs. Bowler Bros., and arrange to send in June or July for cuttings for trial.

Importation of Live-stock from the United Kingdom.—In order to safeguard the Dominion against the introduction of foot-and-mouth disease, the regulations under the Stock Act have been amended to prohibit the importation of cattle, sheep, and swine, also fodder for live-stock, from the United Kingdom. The prohibition came into force on the date of gazetting—23rd February.

THE TOP-DRESSING OF FIORIN GRASSLAND.

EXPERIMENT AT ALFREDTON.

F. W. GREENWOOD, Instructor in Agriculture, Wellington.

In the Eketahuna, Alfredton, and other districts with similar soil and climatic conditions it is common to find instances where fiorin and brown-top (*Agrostis* spp.) have taken possession of the pasture to such an extent as to render the redemption of the paddock a very difficult undertaking. For the information of those readers unacquainted with the Eketahuna and Alfredton districts it may be stated that the annual rainfall in this part of the Wellington Province is both heavy and well distributed. The Dominion Meteorologist supplies the following figures for the year 1920 :—

Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Rainfall (Inches).												
1·93	1·35	1·86	1·67	2·87	3·70	5·30	6·96	2·93	8·84	5·54	8·42	51·37
Number of Wet Days.												
11	4	9	9	13	16	19	18	11	21	14	14	159

Fiorin is a grass of twitchy habit which thrives particularly in damp conditions. Taking this fact into consideration, it is by no means surprising that so many paddocks in these and other similar districts make the transition so rapidly and with such facility from good English grasses to what is considered to be a comparatively worthless or at least inferior fiorin pasture. In the United States of America red-top and brown-top, grown under somewhat different soil and climatic conditions, are used for hay. It therefore becomes a question as to whether it is not possible for us in New Zealand either to improve the quality of the fiorin grown—seeing that in any case it is the practice here with some to hay it—or to supersede it with better grasses. It has been suggested that this result might be obtained through liming and top-dressing, and last year arrangements were made for an experiment to be carried out by the Department that might throw some light on the possibilities of such treatment. For this purpose we availed ourselves of an offer by Mr. A. J. Rutherford of the use of a paddock at Alfredton, situated about twelve miles eastward of Eketahuna.

This paddock is about 7 acres in area, and slopes gently from the foot of the hills behind towards the road in front. The soil is mainly a white papa clay having but a light surface soil. It is rather impervious to water, and, although pipe drains have been laid in places, the paddock would benefit from still further drainage. Even after several days' sunshine it is impossible, at most times, to walk over the ground dryshod. The Department's Chemist analysed the soil for lime requirement, and reported that a dressing of 2 tons 14 cwt. of ground limestone would be necessary to counteract sourness. In the past the land has grown good swedes and fair crops of oats, as well as clover and

FIG. 1. GENERAL VIEW OF THE PADDOCK AT ALFREDTON, TAKEN BEFORE TOP-DRESSING.

FIG. 2. VIEW FROM SAME POSITION AS FIG. 1, TAKEN AT HAYING-TIME, SHOWING EFFECT OF TOP-DRESSING.

Plot 2 (Nauru super) in foreground, and plot 1 (control) in background.

cow-grass. About seven years ago it was laid down in good English grasses and clovers. The take was poor, and at the time our experiment was started fiorin, danthonia, and various weeds held undisputed sway.

For experimental purposes the paddock was divided into seven one-acre plots running at right angles to the road. On 18th August the lower 3½ acres fronting the road and including half of each plot was top-dressed with ground carbonate of lime from Mauriceville at the rate of 1 ton per acre. This part of the paddock was the wetter and more acid portion. The plots were then top-dressed in the direction of their greater length, and at right angles to the liming. Printed signs were fixed to the fence at the end of each plot indicating the treatment employed. Starting from the left and working towards Alfredton Township on the right, the acre plots were as follows: (1) Control; (2) 2 cwt. Nauru superphosphate; (3) 2 cwt. Nauru ground-rock phosphate; (4) control; (5) 2 cwt. Ephos Egyptian phosphate ("New Ephos"); (6) 2 cwt. basic slag; (7) control.

On 22nd November I visited the plots and made the following notes. Although, as is naturally to be expected, all plots show a considerable growth of fiorin, beneficial response to top-dressing, in so far as the encouragement of better grasses is concerned, has been observed as follows:—

Plot 1 (Control): Cow-grass and alsike better on limed portion than on unlimed. A few old heads of foxtail on upper unlimed portion, but more on lower. White clover doing well on east side of whole plot.

Plot 2 (Nauru super): Very much better than plot 1. More rye-grass and foxtail, but clover about the same as plot 1.

Plot 3 (Nauru ground rock): Poor in rye-grass, fair in meadow-foxtail, good in white clover. Rye-grass has come away well on unlimed portion. Whole plot not as good as plot 2.

Plot 4 (Control): Foxtail and rye-grass good; clover poorer than in plots 1, 2, and 3. Damp portion in rushes; poor growth of grass and clover. On eastern and drier side of drain rye-grass and white clover good.

Plot 5 (Ephos): A good plot, generally better than plot 6. On limed portion white clover good and foxtail fair. Top portion (unlimed) better in cow-grass and rye-grass than bottom.

Plot 6 (Basic slag): Fairly poor all over, but large portion of limed area damp and sour. Fair amount of rye-grass at bottom, but growth short. Unlimed portion worse than bottom in white clover, but fair amount of cow-grass; drier portion under lime good with white clover and foxtail; generally more white clover on limed portion than on unlimed.

Plot 7 (Control): Fair; foxtail and rye-grass higher on limed portion than on unlimed.

To summarize, I may say that on the occasion of this visit the effect of the lime in bringing away the white clover and cow-grass was decidedly evident. The presence of many better pasture-plants on the manured plots was more marked than it was on the controls. That portion of the paddock treated with Nauru super and lime showed a better growth of good grasses than did any other portion of the paddock. The unlimed portion treated with Nauru super would probably not have looked so well were it not for the fact that this ground is higher and drier than that of the immediately surrounding plots.

RESULTS IN HAYING.

All the plots were hayed on 19th January, and the yields from each half-plot taken and reported on by Mr. J. M. Smith, Assistant

Instructor in Agriculture. The weights of green material were as follows :—

Plot.	Limed.			Unlimed.		
	Tons	cwt.	lb.	Tons	cwt.	lb.
(1.) Control	2	14	92	2	6	48
(2.) Nauru super	8	3	104	6	18	24
(3.) Nauru rock	5	18	104	5	14	92
(4.) Control	2	17	96	3	1	28
(5.) Ephos phosphate	4	0	60	3	5	50
(6.) Basic slag	4	13	24	4	1	6
(7.) Control	1	19	72	1	18	64

In the case of the control plots there is so far not sufficient difference in yield to allow us to draw any conclusions regarding the efficacy

FIG. 3. NEAR VIEW OF PLOT 3 (NAURU GROUND ROCK) AT HAYING-TIME.

of the lime. The difference in clover content is, on the other hand, beyond dispute. It will be seen in the case of the central control plot (No. 4) that the unlimed portion has given a higher yield of green fodder. This discrepancy may be accounted for by the higher and drier soil on this portion of the plot. The crushed carbonate of lime has scarcely had time to act as yet.

Nauru superphosphate has accounted for the highest yields in the whole paddock. It is, moreover, evident that the yield was greatest when the fertilizer was used after the lime. The portion of the plot on which the super alone has been applied is higher than that which has been limed. The first four plots can be regarded as fairly uniform,

but the last three are not so, and no comparison as to the relative value of Nauru phosphate with basic slag and Ephos phosphate can be drawn. From an examination of the controls it looks as if Nauru phosphate, basic slag, and Ephos phosphate will double the production of herbage from land of this character, also that superphosphate, and super together with lime, will more than double the yield in the first season. The real objective of this experiment is not so much to determine to what extent top-dressing will increase the yield, but to determine what changes in the composition of fiorin grassland will take place by top-dressing.

So far as Nauru ground phosphate rock is concerned, it cannot be said from the results of the haying test that lime used with the manure has been beneficial or deleterious; the margin of difference is too small to allow of any such statement. Nauru ground rock dissolves less quickly, and therefore acts much more slowly than does the superphosphate where the soil is not particularly acid. In the soil of the paddock at Alfredton, considering its sour, wet state and its consequently heavy lime requirement, it may be expected that better results will show from the Nauru phosphate next year.

It appears, from looking at the results given on the plot treated with Ephos, that the combination of Ephos and lime has been distinctly superior to Ephos used alone. The same seems to be true of basic slag to a less extent. Unfortunately, the limed portion of the basic-slag plot is so low and wet as to put both the manure and the lime at a disadvantage when compared with the limed portion of the Ephos plot.

The cost of phosphatic manures, together with lime, placed on the paddock at Alfredton runs from £3 10s. to £4 10s. per acre, while the manure without the lime runs from £1 10s. to £2 10s. per acre. Ground limestone from Mauriceville costs about £2 per ton delivered at Alfredton. It will be seen that these costs are relatively high, but as there is a local lime deposit which could easily be worked, and which in most cases is so fine as to require little crushing, the reduction of the cost of liming should be within measurable distance so far as the Alfredton settlers are concerned. It may be mentioned that the local limestone in question is a high-grade one, running from 92 to 94 per cent. calcium carbonate, and that, so far as I can see, it should pay, taking into consideration its friable condition, to apply it without any attempt at further crushing. With a view to ascertaining the value of the local lime deposit the Department is carrying out another experiment in one of Mr. Rutherford's paddocks.

The paddock containing the top-dressing experimental plots is being kept under observation under grazing-conditions, and further results will be recorded in due course.

Noxious Weeds.—Recent declarations under the Noxious Weeds Act by local bodies comprise the following: Whangaroa County—hakea.

Sale of Wheat.—Although the current Wheat-control Regulations prohibit private dealing in wheat generally, quantities not exceeding 100 bushels are exempted from this rule. As regards seed-wheat, the maximum price of the machine-dressed article is fixed at a premium of 5d. per bushel over the price for good milling-wheat.

AGRICULTURAL LEGISLATION OF 1921-22.

FROM the viewpoint of rural interests the most noteworthy legislative feature of the parliamentary session of 1921-22 was the Meat-export Control Act. As, however, the full text of this measure was published in last month's *Journal*, further reference to it here will not be necessary. Three agricultural measures proper which were enacted may be briefly summarized as follows:—

Noxious Weeds Amendment Act.—This measure was passed in the first or short session of 1921. Its purpose is to assist in the control of fireblight. Hawthorn, one of the principal agents in the spread of fireblight, is added to the Third Schedule of the Noxious Weeds Act, and may therefore be declared a noxious weed by any local authority. It would then have to be cleared by occupiers of land in that local authority's district. Provision is made that a local authority may declare the plant to be a weed in part only of its district. The planting and sale of hawthorn is prohibited for the future.

Rabbit Nuisance Amendment Act.—This small amending Act deletes from the Rabbit Nuisance Amendment Act of 1918 the provision making the sufficiency of work done in destroying rabbits depend on the opinion of an Inspector. In future proceedings under the Act this matter is left to the discretion of the Magistrate. The provisions of 1920, enacted as a safeguard to the 1918 Act, are consequentially repealed.

Orchard-tax Amendment Act.—This short Act extends until 1926 the period during which the orchard-tax is payable by fruitgrowers.

The following are other measures passed affecting rural interests:—

Land-tax Amendment Act.—This provided for a rebate of 10 per cent. on the due amount of land-tax if paid within twenty-one days of the date fixed for payment.

Incomes of Co-operative Dairy Companies.—The Finance Act (No. 2) has an important provision in regard to the calculation for income-tax purposes of the income of co-operative companies manufacturing butter, cheese, or dried milk. The total receipts of the company are not taxable, but from the gross income derived from the treatment, manufacture, and sale of products of milk there is deductible an amount equal to the amount paid or payable by the company during the income-tax year to suppliers in respect of milk or butterfat supplied. This provision is a substitution for the 1920 provision dealing with the income-tax of co-operative dairy companies.

Valuation of Land Amendment.—This Act contains a provision which will afford relief in certain cases where agricultural and pastoral societies are rated on high valuations of their showgrounds. The Valuer-General is instructed when valuing such grounds to take into consideration the limited or restricted purposes to which they are applied, and to reduce his assessment accordingly.

General.—There may also be mentioned, as of interest to farmers, the Mortgages Extension Amendment Act, the Animals Protection and Game Act (a consolidation and amendment of the existing law), the Forests Act, and various laws concerning the tenure, &c., of Crown lands.

—*T. D. H. Hall, Wellington.*

MODEL APIARY BUILDING AT RUAKURA.

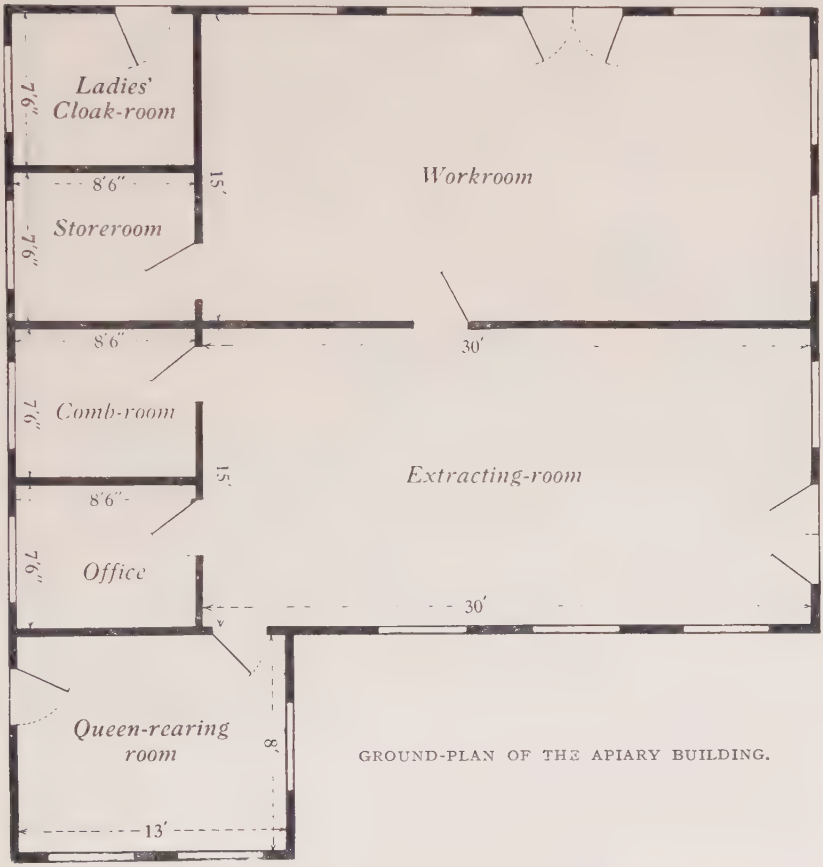
A. B. TRYTHALL, Apiarist, Ruakura Farm of Instruction.

THE recently erected apiary building at the Ruakura Farm of Instruction, Hamilton—a photograph and ground-plan of which are shown herewith—has been designed with a double purpose: Firstly, the provision of convenient and up-to-date accommodation for the instruction of returned soldiers and other trainees (of whom an average of over forty per year have attended the course for the last four years); and, secondly, to serve as a model for beekeepers who are desirous of erecting suitable apiary buildings.

GENERAL VIEW OF THE RUAKURA APIARY, SHOWING THE NEW BUILDING.

Each of the two main rooms—workroom and extracting-room—is 30 ft. by 15 ft., with a 12 ft. stud, and contain the maximum amount of window in order to give as much light and ventilation as possible. The extra height not only makes the building very comfortable to work in during the heat of summer, but provides space to tier up supers and appliances for the large portion of the year when they are not in use on the hives. The extracting-room is match-lined and ceiled in order to make it bee-proof, and the windows are screened with wire-gauze shutters containing bee-escapes, by which the room is automatically kept free from bees. The workroom is neither lined nor ceiled, thus giving extra air-space and ventilation, and providing facility for storing timber above the ceiling-joists.

The lean-to room at the side is 13 ft. by 8 ft., and is used for queen-rearing. It has accommodation up to twelve hives, the bees having access through the walls of the building. The hives containing the breeding-queens and cell nurseries are therefore under cover, and largely independent of outside weather conditions, this facilitating the grafting of larvæ and other operations requiring warmth. After the queen-rearing is over for the season these hives are utilized for cleaning up the drip-combs after they leave the extractor. By using the room for this purpose it is easy to avoid setting up the robbing-conditions so often present when drip-combs are distributed to the hives throughout the apiary.



GROUND-PLAN OF THE APIARY BUILDING.

The lean-to portion at the back of the building is divided into four small rooms, 8 ft. 6 in. by 7 ft. 6 in. each, which are used for special purposes peculiar to the Ruakura establishment, and therefore probably quite unnecessary to beekeepers generally—namely, cloak-room for lady trainees, storeroom, office, and comb-room.

Electric light is installed in the building, and it is hoped later to have a small electric motor to drive the extractor and circular saw, which, with electric heater and honey-pump, will bring the plant right up to date, and serve as a complete demonstration.

OTAGO LUCERNE-GROWING COMPETITIONS.

R. B. TENNENT, N.D.D., Instructor in Agriculture, Dunedin.

DURING this season a lucerne-growing competition was instituted by the Otago Agricultural and Pastoral Society in co-operation with the Agricultural Instruction Branch of the Department. The competition was divided into two classes, one for irrigated and the other for non-irrigated lucerne. Prior to the date upon which entries closed (30th December) most of the lucerne-growers throughout Otago were notified by circular of the particulars relating to the competitions, and a fair number of entries was thus obtained.

Each competitor furnished full data in regard to treatment meted out to the crop, such as preliminary preparation of the soil, rate of sowing and variety of seed, manures used, and other information of such nature, so that when reviewed in their entirety the entries afford very valuable information respecting the different methods adopted by the individual growers. The points upon which the crops were adjudicated are as follows: Freedom from weeds, evenness, quality and colour, and general appearance—a maximum of 25 marks for each, or 100 in the aggregate. A challenge shield for irrigated lucerne was presented by Messrs. Nimmo and Blair, of Dunedin, and for the non-irrigated lucerne a challenge trophy was donated by the Waitaki Dairy Company. In addition to these, monetary prizes were also awarded.

The crops were judged by the writer during the second fortnight of February, and considerable interest was evinced by the various competitors and others. The results of the two competitions were as follows: *Irrigated Lucerne*—First, Otago Central Fruitlands (Limited), 90 points; second, George Manson, sen., Bannockburn, 88 points; third, Towan Bros., Cromwell, 80 points. *Non-irrigated Lucerne*—First, R. W. Trotter, Kurow, 95 points; second, Moa Seed-farm, 73 points; third, H. C. Stevens, Kelso, 70 points.

The successful competitors fully deserve the premier places allotted to them, and the results obtained are a direct reflection of the care and attention which they have bestowed upon their lucerne crops. The crop entered by Mr. Trotter, of Kurow, is really the best that has come under my notice for some considerable time, and is a splendid example of successful utilization of the gravelly soils adjacent to the Waitaki River.

In the case of Messrs. Towan Bros. two plots were entered for competition, these being twenty-three and sixteen years old respectively. The twenty-three-year-old field is one of the oldest in New Zealand, and still retains the vigour of youth, being a truly remarkable stand. One drawback, however, eliminated this field from securing a place in the competition—namely, the ingress of grass primarily induced by irrigation; but this could only be expected in a crop consistently irrigated for such a lengthy period. The sixteen-year-old crop entered by these growers secured third place, a meritorious performance when one bears in mind that the majority of the plots entered for competition were comparatively new, with the virility of youth.

A pleasing feature of the competition is that a much keener interest is being taken in the cultivation of lucerne in Otago than has previously been the case, and the majority of farmers are now fully alive to the fact that for hay purposes, as well as for green succulent feed, lucerne in most localities has few rivals. The primary object of the competition, however, is to promote a true appreciation of the value of the lucerne-plant to farmers, and induce those who are growing lucerne to bestow upon it, with due regard to economy, the care and attention which it merits.

The results obtained from this year's competitions are so gratifying that it is the intention of the Otago Agricultural and Pastoral Society to continue along the same lines next season, when it is expected that a greater number of entries will be forthcoming.

VINEGAR-MAKING IN SMALL QUANTITIES.

J. C. WOODFIN, Vine and Wine Instructor.

VINEGAR is made from sugary and starchy substances by alcoholic and subsequent acetic fermentation. In France vinegar is made almost exclusively from wines, though M. Barbier, in 1903, patented in that country a process for making vinegar from skim-milk and sugar, which is first neutralized with chalk, then pitched with yeast to cause alcoholic fermentation, and finally with Mycoderma aceti to oxidize it into vinegar. In the United States of America cider-vinegar is in great favour. A household vinegar is made in Germany from ingredients in the following proportions: $7\frac{1}{2}$ gallons of soft water, 2 lb. of honey, 1 gallon of grain-spirit, and 2 oz. of cream of tartar. In the British Empire the use of malt vinegar predominates, though other vinegars are manufactured locally, as, for instance, in parts of Wales and in Monmouthshire, where a quantity is made from perry and crab-apple cider. The principles involved in the manufacture of these vinegars are, however, identical.

Amateurs frequently find that the beer, cider, or wine they have made has not turned out quite what they expected—the flavour is not quite right, or there may be already a commencement of acetic fermentation, which renders it unpalatable. It may still, however, be suitable for making vinegar. For flavour and aroma home-made vinegars from red and white wine, cider, perry, mead, and the fermented juice of fruits such as currants and gooseberries are considered by many as far superior to commercial vinegars, which are made principally from grain, glucose, or sugar, with the addition of caramel for colouring and artificial flavourings.

The acetic acid, which is the essential component of vinegar, is transformed from alcohol by a special ferment known technically as "Mycoderma aceti," or more generally as "mother of vinegar" or "vinegar-plant," which forms into a kind of network and floats on the surface of the liquid. It is necessary that this film should remain on the surface, as it requires air for its development and to aid it in oxidizing the alcohol. The Mycoderma aceti also requires a warm atmosphere to work in, 70° to 90° F. being the most favourable.

Higher or lower temperatures retard its growth. To facilitate the process the barrel containing the alcoholic liquor can be placed outside in the sun or shade according to the temperature existing, or, in cool weather, inside near the stove.

In case it is not desired to use the barrel already containing the fermented liquid, or where its transformation therein is not practicable, a clean barrel which has contained vinegar, wine, or spirit can be used. It should be thoroughly scalded with steam or water beforehand. Then it can be placed on its end and the top taken out or knocked in, and covered with cheesecloth to keep out the vinegar-flies while the acetic fermentation is progressing; or, for continuous use, a barrel laid on its side with the bung-hole uppermost is more convenient. This barrel should have a couple of $\frac{3}{4}$ in. or 1 in. holes bored in the upper part of the ends, and these should be covered with fly-proof muslin, mosquito-net, or wire mesh previously varnished. With the aid of the bung-hole, covered in like material, a free circulation of air can thus be obtained. The hoops should be painted or varnished to preserve them from the action of the acetic acid, which corrodes most metals, and a wooden tap placed 2 in. or 3 in. from the bottom of one of the ends. The barrel can now be firmly fixed so that the vinegar-plant will not be disturbed by vibration, and partly filled with the alcoholic liquid, leaving about a third or a fourth of the barrel empty to allow a free circulation of air over the surface of the liquid.

To make a good vinegar containing 6 to 10 per cent. of acetic acid the fruit-juice, sugar, or honey solution, before fermentation, should contain from 12 to 20 per cent. of saccharine matter, which will produce when fermented from 6 to 10 per cent. of pure alcohol, and when transformed by acetic fermentation 6 to 10 per cent. of acetic acid. In a liquid already fermented the desired strength can be regulated by diluting with water, or adding sugar or honey, and refermenting. To test the saccharine contents of the original must or unfermented liquid a Baumé hydrometer, or a Brix or Balling saccharometer, can be employed. Either of these can be purchased for 5s. to 6s. The degree Baumé is equal to 2 per cent. of sugar in the liquid at 60°, and the Brix and Balling degrees are equal to 1 per cent. If on testing the sugar contents are found to be insufficient, 4 oz. of cane-sugar or 5 oz. of honey should be added for each additional degree of alcohol or acetic acid it is desired to obtain. These figures are not scientifically exact, but they are convenient to work from, and give results near enough for the purpose.

To ensure the introduction of the right ferment and the exclusion of the Mycoderma vini—which forms a thicker film, of a whiter appearance than the Mycoderma aceti, and transforms the alcohol into carbonic-acid gas and water—a small culture of Mycoderma aceti can be developed in a shallow basin or saucer, placed in a warm corner, from an alcoholic liquor, such as wine or beer, mixed with a little vinegar, and the film when formed transferred to the surface of the liquid in the barrel. The same object can be obtained by pouring a bottle of acetic acid or 10 per cent. of vinegar from a previous brew into the contents of the barrel. The alcoholic fermentation must be complete before the vinegar ferment is introduced, or the yeast ferment will be stopped by the acetic acid and unfermented sugar will remain in the vinegar.

Under favourable conditions a good vinegar will result in about three months. If it contains over 10 per cent of acetic acid this will act as an antiseptic to unfavourable bacteria; but in vinegar of a lower strength when the alcohol falls below 1 per cent. the bacteria destroy the ethers and finally the acetic acid itself, which is oxidized to carbonic-acid gas and water or undergoes what is known as putrid fermentation. To obtain a perfect vinegar 1 to 1½ per cent. of alcohol should remain unconverted. This increases the flavour of the vinegar when maturing in the barrel. The amateur who has no means of ascertaining when this point is reached can arrest further development when in his judgment a full vinegar flavour has been obtained. The vinegar can then, if not already clear and bright, be filtered through a flannel bag or clarified with isinglass, and heated up to 130° F. to ensure good keeping-qualities by killing all bacteria, ferments, or vinegar-eels. It can now be run into a clean barrel and stored for a year, which will greatly improve its flavour. The barrel should be kept tightly bunged, and vinegar added from time to time to replace that which evaporates through the wood.

If it is desired to bottle it at once it should be allowed to cool before doing so, or, better still, it can be pasteurized in the bottles. A convenient method for withdrawing the vinegar from the cask when no tap has been inserted is to siphon it off through a small rubber tube attached to the lower end of a stick, so that its lower end will be well above the lees, which should not be disturbed. The stick is then let down into the barrel and the vinegar siphoned off into the bottles.

In the continuous barrel process about a third of the vinegar can be drawn from the barrel, and a like quantity of fermented liquid added through a funnel with a long spout, so as not to rupture or precipitate the Mycoderma aceti film. This operation can be repeated whenever the vinegar is ready to draw.

To clarify vinegar which is not clear and bright the substance giving the best results is isinglass, employed at the rate of 1 oz. per 100 gallons of vinegar, broken up into small pieces and each ounce soaked in a gallon of warm vinegar until it swells up and becomes soft. It should then be passed through a hair sieve and any lumps that are retained broken up. The solution should be of a perfectly smooth consistency before being used. In this condition it can be added to the bulk of the vinegar, thoroughly mixed by stirring with a suitable piece of wood or stick, and allowed to stand about a week to permit the isinglass to settle to the bottom, dragging down with it the substances which were the cause of the cloudy appearance in the vinegar. The clear vinegar can then be siphoned or drawn off through the tap.

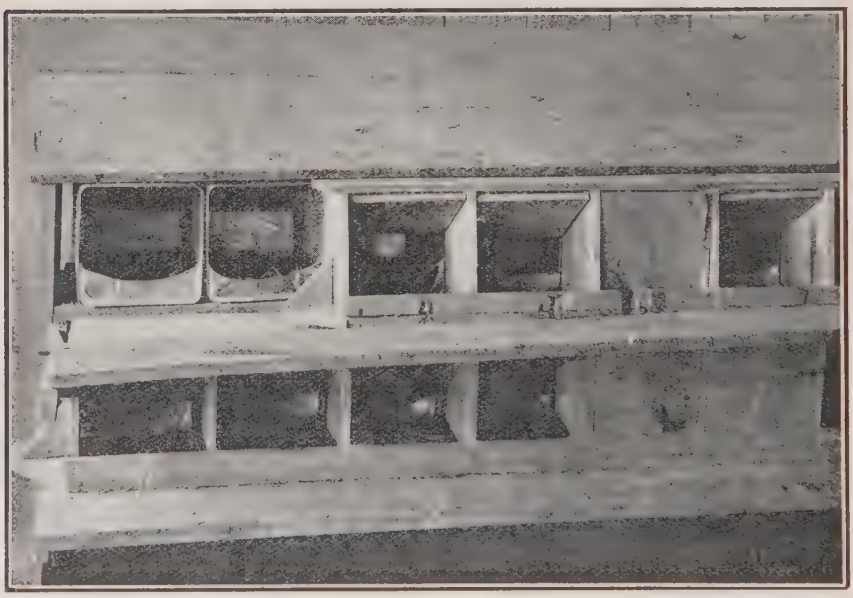
In order to avoid the introduction of the Mycoderma aceti into honey or weak alcoholic liquors such as beer, cider, mead, or wine, vinegar should not be manufactured in or near buildings in which these are handled or stored.

Economic Entomology.—In order to carry out successfully a study of insect-habits and to apply such knowledge economically it is necessary to cultivate the practice of minutely observing even the apparently least important features. Not only the insect must be studied, but also its surroundings, foods, &c., the relation between the environment and life-history being the key to prevention and control.—D. M.

A SIMPLE TRAP-NEST FOR THE FOWLHOUSE.

F. C. BROWN, Chief Poultry Instructor.

THE accompanying illustrations show a simple style of trap-nest for ascertaining the egg-yield of individual fowls. It is especially suitable where kerosene-tins are used for nests, and it can be made continuous in sections to suit requirements. As will be seen, the trap-door arrangement rests on the platform by which the hens enter the kerosene-tin nests, which are used in the ordinary way. Thus it is easily removable when trap-nesting becomes unnecessary. The top, door, and partition are made of 8 in. by $\frac{1}{2}$ in., and the door-stop of 2 in. by $\frac{1}{2}$ in. timber.

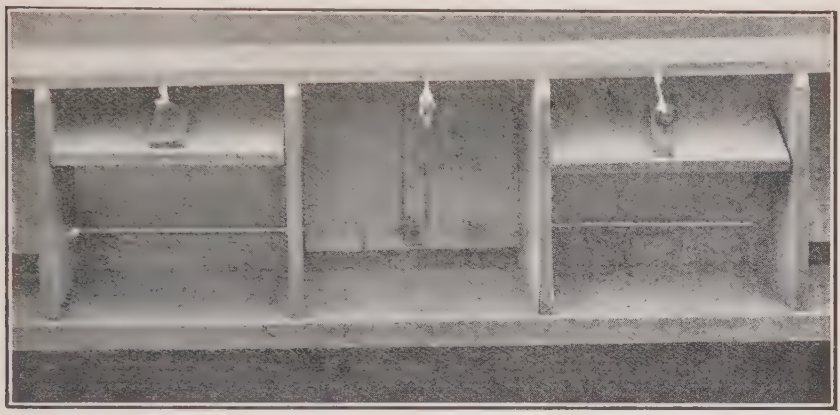


FRONT VIEW OF TRAP-NESTS.

For these parts dressed timber is preferred. The bottom is of 9 in. by 1 in. timber. The partitions are $9\frac{1}{4}$ in. apart, the doors being 9 in. wide. Thus a space of $\frac{1}{8}$ in. on each side of the door is left for ventilation, which is essential during hot weather. For the same reason it is not advisable to place the trap-door arrangement hard up against the tin nests, while at least a quarter should be cut out from the top of the back end of the tin.

The two door-hinges are made of soft leather fixed on with tacks. A piece of $\frac{1}{2}$ in. timber is nailed to the inside of the door to prevent the latter from splitting when striking the door-stop. For holding the door in position when the trap is set, an ordinary $\frac{1}{2}$ in. iron washer

suspended by a piece of thin fishing-line is used, the latter being fixed to a screw-eye or bent nail in the top. A 1½ in. nail is driven through the door from the front, the inside portion being bent towards the tin nest and acting as a catch for the washer. When the bird enters the trap its back lifts the door, and, the supporting string and washer being fixed in a line behind the catch, the washer drops from the catch and swings back, the door falls down, and the bird is entrapped. The stays at the ends of the sections are made from the corner pieces cut from the 9 in. by 1 in. bottom-board.



REAR VIEW OF TRAP-NEST FITTING, SHOWING DETAILS OF THE DEVICE.

SEED-TESTING NOTES: CHEWINGS FESCUE.

CHEWINGS fescue (*Festuca sabulicola*) is grown and harvested mainly in the Southland District, and has there become a rural industry of some importance in consequence of the large quantities shipped overseas. A fair amount of Chewings is used in this country in permanent pasture, lawns, &c., but by far the greater quantity is exported to Europe and the United States of America, where it is used mainly for the laying-down of golf-links and lawns. The dressing of the 1922 crop is now in hand, and a large number of samples of new season's seed have been germinated at this Laboratory. Most of the lines have been of farmers' dressed seed, and consequently the germination percentages are not at all representative of what the germinations of cleaned seed will be. For instance, a line containing 40 per cent. of empty seed and giving a germination of 50 per cent. can be considered satisfactory, as the dressing will clean out at least 30 per cent. of the light seed, leaving a possible 80 per cent. which will germinate. This type of seed will, of course, need heavy dressing, but as some of the better-cleaned farmers' dressed seed has given germinations as high as 80 per cent. the season promises to be a very fair one, although it is evident that, as in the past, a percentage of the seed will not be of high germination.—*N. R. Foy, Biological Laboratory, Wellington.*

CORRESPONDENCE.

MACROCARPA-CYPRESS PLANTATIONS FOR SHEEP-SHELTER.

Mr. Claud H. Williams, of "Coventry," Muriwai, Poverty Bay, writes as follows:—

I should like to bring before the notice of *Journal* readers the great value of *Cupressus macrocarpa* for the purpose of a shelter-plantation adjacent to the wool-shed. Almost every sheep-farmer knows the anxiety of a cold southerly storm at shearing-time, and many have had serious losses of stock to reckon with, for these cold snaps often come up very suddenly, and only a limited number of sheep can be held in the shelter of the wool-shed. Often, too, when sheep have been in the shed the previous night it is imperative to allow them food. Much anxiety and loss can be saved by providing an acre or two of macrocarpa near the shed. The trees should be planted 6 ft. apart in a square block, and care should be taken to secure the erect and not the bushy variety; the latter are more likely to die with the close planting, besides being very much less valuable for timber. The erect variety is procurable from the State Forest Service nurseries at Whakarewarewa at a reasonable price, provided application is made in plenty of time. In about six years, provided the soil is suitable, the lower branches can be trimmed off, and the plantation be made ready for its purpose. With a good secure fence, and a nice stack of hay in one corner, a farmer can smile at the severest weather, for the macrocarpa has a peculiarity which renders it a rainproof shelter. The side branches shoot off from the stem at an acute upward angle; heavy rain runs down the branches, then down the trunk, and a streamlet will be found running away from the butt of each tree, while hardly a drop will reach the ground in the intermediate spaces. Of course, this ideal condition will be quickly reached only if the initial planting is a thorough success; but the macrocarpa is very rapid in its growth, and with ordinary luck the plantation should not only be fit for its main purpose in six or eight years, but many of the trees will be found to be almost at the gate-post or strainer-post stage. In ten or twelve years it should be possible to cut hundreds of posts 10 in. in diameter without seriously destroying the shelter value of the plantation. Sapling macrocarpas will last extremely well in the ground. I have myself examined a 10 in. sapling after eighteen years' service as a gate-post, and found it absolutely sound except for a comparatively thin layer of sap-wood. Two acres will accommodate about 2,500 trees at 6 ft. apart, and as time goes on the plantation can be gradually thinned down until finally probably a tree every 18 ft. or 24 ft. would be sufficient to cover the ground. It is easy to calculate the immense value in posts and firewood which would be reaped in the successive thinnings, quite apart from the added security for newly shorn sheep in bad weather.

Apiary Field-day at Ruakura.—Some two hundred beekeepers and others attended the annual field-day of the Auckland Provincial Branch of the National Beekeepers' Association at the Ruakura Farm of Instruction on 8th February. The visitors were welcomed by Mr. A. W. Green, Farm-manager, and Mr. C. Smedley, president of the branch, gave an opening address. After an inspection of the new apiary building, the points of which were explained by Mr. A. B. Trythall, Apiarist in charge, the following programme of addresses and demonstrations was carried out: When and how to requeen hives (Mr. W. Copsey); working with "Hand" bottom-boards (Mr. Wedde); out-apiary work (Mr. C. S. Hutchinson); hive-record keeping (Mr. C. Smedley); handling honey from hive to store (Mr. G. V. Westbrooke); foul-brood and its treatment (Mr. A. Goodin); Honey-producers' Association operations (Messrs. Fraser, Jordan, and Turbott). Written questions were dealt with by Mr. Isaac Hopkins. Beautiful weather was a contributing factor to a very successful gathering.

WORK FOR THE COMING MONTH.

THE ORCHARD.

FRUIT SHIPMENT PER "WESTMORELAND."

THE first shipment of this season's fruit for export, comprising 14,715 cases of apples and 600 half-cases of pears, was duly despatched to London by the "Westmoreland," which sailed on 24th February. The varieties of apples shipped were chiefly Cox's Orange, Dunn's, and Worcester Pearmain, with other varieties in lesser number. A small experimental shipment of Worcester Pearmain apples taken from trees about six and a half years of age was also shipped, and arrangements are being made for a report to be furnished on their condition on arrival in comparison with the fruit shipped from older trees. The pears were all of the Louise Bonne de Jersey and Beurre Clairgeau varieties, and have been shipped more in the nature of an experiment.

The general quality of all the fruit sent forward was well up to the standard. Possibly some may have been a little over the stage of maturity required for export, on account of being held back in ordinary storage by growers as long as possible, instead of being examined early and placed in cool store until time of shipment. Arrangements are being made for the precooling of future shipments in Wellington, and growers should avail themselves of this favourable opportunity by sending forward their fruit as soon as it is ready, thus taking advantage of every available means of placing the fruit on the overseas markets in the best condition.

Considerable irregularity was noticeable in the method of marking the cases of the "Westmoreland" shipment, chiefly in the placing of the essential particulars on the cases. In this connection the attention of all exporters is directed to the recommendations of the Department as set out in the circular, "Marking of Cases of Fruit for Export," which has been freely distributed. Careful adoption of the advice given therein will be of decided benefit to fruitgrowers, by tending to curtail the amount of handling necessary when the fruit is being sorted at its destination.

FIREBLIGHT.

Latest reports on the general fireblight position in the North Island remain reassuring, no fresh outbreaks having been recorded from the Auckland Province or elsewhere. The outbreak in the Patea district is considered to be well under control, active measures having been taken to deal effectively with infected trees.

—*W. T. Goodwin, Assistant Director of the Horticulture Division.*

AUCKLAND.

The stone-fruit season concluded, growers would do well to pick up and destroy all mummified fruits from the orchard, in order to minimize the source of infection of brown-rot for next season.

There appears to be an increasing inclination among growers to suspend their applications of arsenate of lead at too early a date. Codlin-moth is usually still active well into April, and it is therefore advisable to continue moth-sprayings right up to the end of harvesting. As woolly-aphis attack is invariably heavy in the autumn, nicotine sulphate, 1–800, should be used throughout in conjunction with the lead.

In cases where citrus-trees have not been sprayed for the control of sucking-insects, such as scales, thrips, &c., red-oil emulsion should be applied at 1–40, care being taken to see that young growth is well hardened off.

By the beginning of April the main autumn crop of lemons will be set, and it is then time (as the blossom-petals fall) to spray thoroughly with bordeaux, 4–4–40, or lime-sulphur, 1–35. If it can be so arranged, oil should follow the fungicide, but an interval of four to five days should elapse between the two applications.

Orchardists who are intending to extend their plantings will find April the best month to get the plough in and commence the final operations for preparation for planting.

—*J. W. Collard, Orchard Instructor, Auckland.*

HAWKE'S BAY.

When picking the late varieties of apples and pears for storage a little care exercised in making selections of fruits that are ready, rather than a general picking, will be well repaid by the results obtained. There are several profitable storage periods for each variety, governed by the maturity at picking-time. The most profitable period results from fruits picked at that stage of maturity indicated by a distinct change of ground-colour from green to light yellow. If for any reason it is impossible to handle the crop as one would desire, and a more or less general picking has to be made, then the various maturity grades should be packed and marked separately. Those of somewhat advanced maturity should be withdrawn from the store first, then the greener grade, and those of selected maturity kept for the full storage period.

Where orchard planting or extension is contemplated prompt attention should be given to the selection of varieties, and the order placed with the nurseryman. Opportunity should be taken to work the proposed orchard land to ensure a good tilth for planting.

The pruning of stone-fruit trees will soon demand attention. This early pruning is very desirable when the trees are infected with brown-rot. All diseased wood should be removed, all prunings, fallen leaves, &c., raked up, and all refuse destroyed. Should San Jose scale be present spray with lime-sulphur, 1–15.

—*W. H. Rice, Orchard Instructor, Hastings.*

NELSON.

During the month of April the later varieties of apples and pears will be harvested. Although of better keeping-quality than earlier varieties, they still require careful consideration as to picking and storing to secure the best results. There is a tendency sometimes to leave them too long on the trees, and while they then gain colour they lose texture and juice, a rather doubtful alternative for apples that have to be kept.

A great deal of labour is occasioned by carting the cull apples with the good to the packing-shed and there sorting them out again. Pickers should be taught to recognize that class of apple and to leave it at the foot of the tree. Some growers here, when the harvest is completed, turn into the orchard a number of young pigs, which find good grazing there for the following three or four months of winter. They are taken out again in good forward condition just about the time of the spring ploughing, and are very profitable. A shelter should be provided for them.

Spraying for the season will be just about over, but where black-spot or brown-rot fungus has been troublesome an application of bordeaux, 3–4–50, should be applied after the crop is picked. An application of red oil, 1–50, should follow where trees are affected with aphis, red mite, &c.

A cover-crop may still be sown if desired. Oats and vetches will make good growth in most sections if sown in or before early April. The application of 2 cwt. or 3 cwt. of fertilizer before the sowing is usually a good policy.

—*W. C. Hyde, Orchard Instructor, Nelson.*

CANTERBURY.

Trees infested with woolly aphis should be sprayed with Black Leaf 40, 1–800 to 1–1,000, with 3 lb. soft-soap per 100 gallons. After the fruit has been picked good results can also be obtained by using red oil, 1–60. If leaf-roller caterpillar is in evidence the trees should be resprayed with arsenate of lead, 3 lb. paste or 1½ lb. powder to 100 gallons. To prevent a late infection of black-spot, growers in localities where fruit is subject to spot would be wise to apply a further spraying of lime-sulphur, 1–120. In orchards where brown-rot has been prevalent gather and destroy all mummified fruits and dead twigs. For gummosis, cut out gum-pockets and disinfect and paint the wounds.

Orchardists should thoroughly investigate the results obtained during the past season from the spraying-compounds used and the methods employed in their application. Progressive growers not only do this, but go further and determine the factors that contributed to success, or to unsatisfactory results, as the case may be. Where unsatisfactory results are obtained something is wrong. Factors which contribute to success are the thorough application of sprays at the correct times, use of the correct compounds, proper mixing of sprays, and an elementary knowledge of the life-history of pests and diseases.

The work of picking, packing, and marketing apples and pears will continue this month; also the placing of the late varieties of apples and pears in cool storage or fruit-storage houses. The greatest care must be exercised in handling fruit for storage purposes, because damaged fruit will not keep in storage and means a financial loss. As soon as the gathering of the crop is finished the orchard should be given a thorough clean-up, and all waste from the current season's crops gathered up and destroyed, as sanitation is the orchardist's greatest protection.

If the green cover-crop is not in, it should be attended to with as little delay as possible. In orchards where cultivation has been regularly attended to it would be wise to give the land a complete rest until the winter ploughing, when the weeds which have grown will be ploughed in before they seed. Growers intending to plant out additional land in fruit-trees should plough it as soon as possible. —*W. K. Dallas, Orchard Instructor, Christchurch.*

OTAGO.

The principal work of the coming month will be the harvesting of crops. Spraying should be continued on the lines advised last month.

The following points with regard to the preparation of fruit for export should be observed :—

Picking: At the first picking select only that fruit which has reached the export stage of development—*i.e.*, when the ground-colour has changed from deep green to pale yellow—leaving the balance for a later picking. Every care should be taken by the picker to avoid bruising the fruit. Cases of fruit should not be allowed to stand about the orchard longer than necessary, but should be removed to the packing-shed as soon as possible after picking.

Grading and packing: Those grading the fruit should also use every care in handling to avoid bruising. Remove all culls, and keep the grades up to the standards set out in the regulations. Packing must be done on the numerical pocket system, and each packer should indicate on the case packed the number of fruits contained therein.

Marking: Where stencils are used, these should be branded on neatly and legibly, smudgy and inferior work being avoided. Labels should be applied with a good reliable paste. Wetting the labels before application has been found a good method of making them stick better. Rubber stamps of the size and type specified in the regulations should be used on labels for filling in the details of the contents of each package. These should be imprinted neatly and legibly without smudging.

—*B. G. Goodwin, Orchard Instructor, Dunedin.*

POULTRY-KEEPING.

F. C. BROWN, Chief Poultry Instructor.

APRIL should see the pullets which have been specially bred, fed, and managed to produce winter eggs gradually coming into profit. If a maximum number of dear-season eggs is to be obtained some special effort on the part of the poultry-keeper is imperative. There must be absolutely no weak link in the chain of management or the birds are apt to go into a false moult, and winter eggs will be lost. Of course, they should now be snugly accommodated in their winter quarters, for changing pullets from house to house when they are about to lay or have commenced laying is only inviting the moulting-process.

In housing the youngsters keep those of different ages as distinct as possible, so that the feeding and treatment may harmonize with the different stages of development of the various birds. Give the birds a plentiful supply of good sound food, with green material in abundance. Do not attempt any forcing in a sudden manner, but rather continue the plain diet and gradually introduce the meat ration. Any change in food or mangement at the present time may prove disastrous. Some animal food is essential for heavy winter-egg production, but there is a limit to the quantity which can be safely used. If the boiled meat, or a substitute such as meat-meal or blood-meal, is fed separately, so that the bird is allowed to balance its own ration, little or no harm will result, but where mixed with the mash and the same ration fed to all members of the flock ovarian troubles and the production of shell-less and double-yolked eggs are almost sure to follow. It will thus be seen that the supplying of meat and meat-substitutes requires to be done with considerable caution.

Birds on free range do not require the same proportion of meat as those in close confinement, and the demand of the latter for such material varies according to the bird's laying-condition as well as to its laying-power. This is borne out by the fact that immediately a bird commences to lay she craves for animal food in some form or other. Above all, see that the sleeping-house is well ventilated without being draughty. Remember that compelling a bird to sleep in a draught or in improperly ventilated quarters is the most common cause of colds, and these should be prevented at all costs. A cold is the forerunner of roup, and once this gets a start in a flock there is no telling when it is going to be stamped out. Prevention is the one and only safe course in keeping at bay this and other diseases which affect poultry.

I would again emphasize the importance of culling out every weak hen on the plant, and marking the late moulters for future breeding purposes before their moult sets in. Be it ever remembered that the points indicating good breeding-power are at no other time so pronounced as when a bird is about to terminate its season of production. Thus if the work of marking the future breeders is now delayed until after the moult it is more than probable that indifferent hens will be bred from during the forthcoming breeding season.

FOODS AND COLOUR OF YOLKS.

It is well known that certain foods will influence both the colour and flavour of eggs. Watercress, chaffed lucerne, or clover will impart the desired rich colour to the yolk, while mangolds or turnips, especially if fed to excess, will result in the yolks being pale and unattractive. The sickly appearance of the yolks of eggs from birds which have been confined in a yard and not provided with any green vegetable matter or judicious ration of animal food does much to discourage the consumption of eggs. Probably the best eggs which reach the market, so far as rich colour is concerned, come from the farm where the birds have a free range and are able to pick up an abundance of green stuff and of animal food in the form of insect life. Thus, where birds are confined, substitutes for these natural foods must be regularly supplied if the desired colour of yolk is to be attained. A good supply of suitable green material will not only tend towards enriching the colour of the yolk, but will also do much for the maintenance of a healthy flock. Animal food such as boiled meat, meat-meal, &c., also helps in giving the desired yolk-colour, and promotes heavy egg-production as well.

It may be here mentioned that from time to time I receive inquiries regarding a very objectionable green colour in the yolk of duck-eggs. This is generally due to the birds eating an excess of acorns or flax-root. There may be other causes, but these are the only two I am aware of.

CAPONIZING.

The question has been asked whether it would not be more profitable to caponize cockerels instead of marketing them in the ordinary way. To my mind there is nothing to be said in favour of the former method so far as New Zealand markets are concerned. Reference has been made to the value of caponizing cockerels in England, but the conditions are entirely different in this country. In any case we have no direct proof that caponizing is practised to any great extent in England. In New Zealand, if the largest profit is to be made from poultry-keeping, egg-production must be made the chief aim, the table-poultry side of the business being treated as merely an adjunct.

Many of our most successful breeders destroy the bulk of their cockerels immediately the sex can be determined. They realize that if a maximum return is to be made every possible foot of space must be kept for the growing pullet. This refers, of course, only to cases where the popular White Leghorn breed is kept. With these the sex can be determined at a very early age, but with the heavier breeds, such as Orpingtons, Rocks, and Wyandottes, unless a person has a trained eye it may be three months or even longer before the sex can be distinguished. It is obvious that when the birds have been kept to this age it will pay to keep them until they attain a marketable condition, at, say, four and a half to five months. It is at this age, prior to producing the adult feathers, that they will be found in a plump condition, but if left longer, whether caponized or not, it will be months before the bird again reaches a marketable condition. This will be readily understood when the drain on the bird's body in producing the thousands of feathers that nature demands is considered.

Under present conditions, as already mentioned, if poultry-keeping is to pay, egg-production must be made the special line, while the male chickens produced should be disposed of to the best advantage. The poultry-keeper may be well

advised to leave caponizing alone, and get rid of his surplus cockerels at a young age. To produce a well-primed capon the bird requires to be kept for eight or ten months before killing. In view of the present high cost of production, and the price that would be received for the bird, this may easily mean a loss instead of a gain. As to the advantages or otherwise of caponizing cockerels, I cannot do better than quote from Lewis Wright's great work on poultry the following statement, which speaks for itself: "Many people imagine that young birds may be caponized and marketed within a few weeks. This is an absolute mistake, and it will be found that such capons would be less profitable than if fed and sold off as cockerels." He further states that, taking all things into consideration, it must be acknowledged that the chief value of caponizing is found in the ability to retain male birds for killing in the autumn without keeping them in confinement. The gain in weight probably does not make any great difference so far as actual profit is concerned.

Caponizing is one of those things which are often advocated by the inexperienced but seldom practised by the practical man for commercial purposes.

THE APIARY.

F. A. JACOBSEN, Apiary Instructor.

BEEKEEPERS will by now be fully occupied in doing the last of their honey-extracting, and preparing their colonies for the winter. Should the autumn be mild the final extracting may be later than usual on account of a long flow of nectar. Thistles will probably yield more at this period than will other plants, and when mixed with that of clover and catsear this nectar will produce a white, clear, and delicately flavoured honey, which forms a splendid exporting article. The danger of robbing breaking out in the apiary will be increased this month, and readers of these notes should peruse the warning given last month under the heading "Removing honey from the hive."

FOUL-BROOD.

In closing down the hives for winter the combs must be carefully examined for foul-brood. Where disease in a bad form is detected do not waste time in treating, but destroy the colony. In mild cases remove the diseased combs and replace with clean ones. Make a note of the infected stocks for treatment in the spring, when fine weather and a nectar-flow will enable the work to be carried out successfully. Do not tinker with diseased hives in the off season, as the trouble is likely to be spread to the clean colonies through robbing, &c.

CARE OF UTENSILS.

At the completion of the season's work the utensils used should be thoroughly cleansed. Wash carefully with boiling water, and dry thoroughly. Where food is concerned, and particularly such delicate food as honey, cleanliness must be observed at all times. When stored away everything should be protected by loose washing covers of fine texture to prevent the accumulation of dust. Give a good coating of oil to any metal parts likely to rust, and thus preserve the life of the plant and save endless trouble the next season.

CARE OF HIVES.

All colonies should go into winter quarters in snug condition. Hives should be raised above the ground-level by means of bricks, and placed in a position where they will secure a good share of the winter sun. Keep the grass short about them to prevent dampness. Where necessary, supers, bottom-boards, and covers should be given a coat of paint. Stop up all cracks, and replace faulty hives with sound ones. Pay special attention to roofs, as it is very important that the bees should come through the winter dry. Occasionally paint is not sufficient to stop leakage, and in such case the roof should be covered with zinc or ruberoid. Cheesecloth is usually serviceable when covered with two good coats of paint. Clean all bottom-boards by scraping. The simplest plan is to lift the hive on to a spare bottom-board, scrape the old one, and replace the hive. Contract entrances against robber-bees and mice, the latter pest being a special nuisance in some districts during the dormant season. If the colonies have sufficient stores and a good mat over the frames they are now ready for winter.

VITICULTURE.

J. C. WOODFIN, Vine and Wine Instructor.

THE VINEHOUSE.

From now on the vines may be allowed to make a little lateral growth; this will act as a safety-valve in case of a heavy rainfall. If the rods are a fair distance from the roof-glass, as they should be, there will be room for some extension of laterals without preventing a current of air passing up between the roof and the vines. This air-current is necessary, for if the space be crowded with lateral growth the leaves will hold the condensed moisture from the atmosphere, resulting in a perpetual state of wetness. This will prevent the berries drying, and, the skin being thin at this time, it is liable to be ruptured where berries touch each other. When this occurs a mould-growth is set up which is communicated to other berries, and a large amount of rot may occur. It is important that the berries should be dried quite early in the day; then the night moisture will do no harm. Therefore, though a little lateral growth is useful, it should not be allowed to become matted, and so choke up what ought to be air-space.

Caterpillars may still do a good deal of mischief by nibbling the berries and causing them to decay or shrivel, or even drop off, as occurs when they eat the skin of the stalks. During the growing-period caterpillars are not much trouble, as syringing disturbs them, and, the growths being under frequent manipulation, they are seen and removed. At this time observation is the only safeguard.

During fine weather both bottom and top ventilators should be in use, but on wet days the house will be drier if kept comparatively closed. Care should be taken to avoid a burst of sunshine on a showery day finding the house closed up. If that occurs there might be a good deal of cracking of berries. A little top ventilation should always be on.

It has been noticed that some amateur growers attempt to keep bunches, after being cut from the vines, by simply hanging them on the wires in the house. This is a mistake, and results in shrivelled berries. The correct method is to cut the bunches with 6 in. of the lateral below the bunch, and half that length of lateral above, the top end being stopped with sealing-wax. Then fill ordinary quart bottles with water, adding a piece of charcoal to each bottle, and place them on a shelf in a dark room or ventilated cupboard, fixing them at an angle that will allow them to remain nearly full of water. The lower end of the lateral is then placed in the bottle. The bottles require a lath or some contrivance to prevent them being upset.

THE GARDEN.

W. H. TAYLOR, Horticulturist.

VEGETABLE-CULTURE.

The sowing of seeds of early varieties of cabbages and of cauliflowers was dealt with in last month's *Journal*. To obtain a crop of cabbages to follow the small-headed early varieties, seeds should be sown during the last week of March. Varieties of the Enfield Market type, which produce larger heads than the early varieties, should be sown for this crop. It may be stated here that for home use it is not necessary to sow again till November, when a sowing is made for the winter crop. During many years of practice in private gardens I grew only two crops of cabbages each year—the spring crop sown at the end of March, and the winter crop sown in November. The spring crop, after the heads are cut, should be allowed to stand. They will produce sprouts which, if limited to about three to each stump, will form well-hearted heads 3 lb. or 4 lb. in weight. Still another crop will follow these, but not hearted heads. Sprouts are much superior in flavour to the first heads. Of course, this practice would not answer in market-gardening.

Lettuce-seed of a cabbage variety should be sown at the same time as cabbage-seed. This sowing will provide the first spring crop; they come into use about October. The seed should not be sown too thickly, as thick sowing produces weakly plants.

The giant kinds of onions are sown now. These kinds have two uses—the production of large bulbs, and of young seedlings for salading and flavouring. For the latter purposes they have the advantage of attaining size quicker than do smaller varieties. Very large bulbs can be got only by sowing in autumn. Some growers sow where the plants are to remain, but it is far better to sow thickly in a small space and transplant early in spring. Transplanting checks the tendency the plants have to bolt to seed in spring, which often causes considerable losses when they are not transplanted. Another point is that, owing to it being necessary to have a firm seed-bed to sow in, the soil is battered down by winter rains and becomes sour. When the plants are transferred to soil that has been kept clean and open and freshly worked before planting, and is consequently in a sweet condition, much better growth is made, and, further, the soil is more easily kept in good state. The smaller varieties, which are those with the best keeping-qualities, and the kinds that are most in demand for market purposes, are best sown in spring. The best market size is from four to six to a pound. Autumn-sown roots are liable to grow too large, and they have not, in most cases, good keeping-properties. Autumn-sown crops ripen earlier than do spring-sown, and this may in some cases warrant such sowing. Another reason is found in the fact that in some districts onion-mildew is a frequent source of trouble, early crops suffering the least injury. The fact remains, however, that autumn-sown crops have not in most cases good keeping-qualities, and such crops grown commercially cannot be held long; they must be disposed of, perhaps on an unfavourable market. For this reason spring sowing should be practised wherever it can be successfully done.

Turnips for winter use should be sown at once if this is not already done. In the warmer districts peas of a dwarf kind may be sown, this sowing providing the earliest crops. Spinach may still be sown in such districts.

Asparagus-tops should be cut down before the berries begin to fall. The cut tops should be carried off at once, or the berries will fall off and the bed be filled with young plants growing as weeds. Hoe off any weeds that may be present and loosen the surface. The application of manure or fertilizer can be left till later.

Growing crops should be kept as free from weeds as possible; a clean and open surface admits sun and air, both of which are beneficial, particularly during the period of short days. Where stable or farmyard manure is not available a green crop should be grown on any vacant plots. In the colder districts white mustard is perhaps the best crop for this purpose; it gives a bulky crop in a shorter time than any other crop. In warmer places there is a choice of legumes, such as field or partridge peas, white or blue lupins, and vetches.

Tree-raising on a Small Scale.—There are several simple methods of raising small numbers of popular forest-trees, such as *Cupressus macrocarpa* or *Pinus insignis*, from seeds. Probably the best way is to sow the seeds in boxes in March. Any, good garden-soil with the addition of sand to keep it open will answer. Water the soil before sowing the seeds, and when the water has drained off add a little fine fresh soil, and press firm with a dry brick. Scatter the seeds evenly on this surface, and cover them lightly with fresh soil—they should be only just covered. Place the boxes in a sheltered position and cover them with pieces of board, or one box may be stood on another and the top covered with a piece of board. If the seeds are fresh the young plants should be up between the third and fourth week, when they should be exposed to light. By July the young plants should be 3 in. or 4 in. high, and should be planted out in the open ground. Choose a nice friable piece of ground; plant in rows 12 in. apart, the plants 9 in. or 10 in. apart. Keep the soil free of weeds and frequently hoed through summer. In March the tap roots should be cut by thrusting a sharp spade under them from each side. This will cause the plants to wilt for a week or so, but they soon recover. About the middle of May lift and heel them in. Heeling means planting close together, the young trees lying in a slanting manner, not upright. In this position they quickly make new roots, after which they may be planted out. By following this plan fine, strong, well-rooted trees are ready for planting about fifteen months after the seeds are sown.—*W. H. Taylor, Horticulturist.*

ANSWERS TO INQUIRIES.

IN order to ensure reply to questions, correspondents must give their name and address, not necessarily for publication, but as a guarantee of good faith. Letters should be addressed to the Editor.

RATIONS FOR GOATS.

ROWLAND HILL, Otuhi, Whangarei :—

In order that goats may be supplied with a balanced ration, what would provide a suitable evening feed for them after a day on (*a*) blackberry and (*b*) gorse ?

The Live-stock Division :—

A small quantity of crushed oats mixed with bran and linseed or pea-meal would form a suitable ration. In the winter season swedes and turnips fed whole, followed by a little oaten sheaf, is often appreciated. In feeding goats the difficulty is not to determine a balanced ration, but to find a ration of any sort that they will eat readily. Goats are dainty animals, and it is very difficult to get them to eat food that they have not been used to. Dry feed is eaten by them more readily than mashes.

FLEAS.

"SUBSCRIBER," Windsor :—

Please describe briefly the life-history of the flea, and state if the same flea which lives on dogs and human beings also lives on poultry.

The Biologist :—

Dogs, human beings, and poultry have each their own peculiar flea, but it frequently happens that dog-fleas and poultry-fleas attack human beings. The three different kinds are, however, much alike in habits and general appearance, and the eggs of all are hatched in rubbish, accumulations of dust, or even, in the case of the human flea, in dirty carpets and upholstered furniture. The grub is a small, active, worm-like maggot which feeds among the rubbish till full-grown, and then builds itself a small cocoon with pellets of dirt, hair, &c., in which it passes the quiescent stage. From the cocoon it emerges as an adult flea, ready to attach itself to the first suitable host it meets.

SAVING TOMATO-SEED.

J. KELLER, Kahikatea :-

Could you kindly tell me the proper way to dry and save my own tomato-seed ?

The Horticulture Division :—

If only a comparatively small amount of seed is required the simplest method is to spread the seeds, taken directly from the fruit, on to a sheet of newspaper. The seeds can be removed from the fruit with the blade of a knife, taking as little pulp as possible. The seeds should be spread evenly, and not too thickly ; being sticky, they will adhere to the paper. When partly dry, pin the sheets to the wall of a room till thoroughly dry, then fold them up and keep in a dry place. When sowing, the sheets can be cut to the size of a box, laid flat on the soil-surface, and a little fine soil scattered over them. If it is preferred the seeds can be easily scraped off the sheets as soon as they are dry. This is a well-tried method. When larger quantities are to be saved take a quite ripe fruit, make an incision with a knife, and squeeze the seeds out into a convenient vessel. Let it stand a few days to ferment ; the pulp is then mostly reduced to a thin liquid. Add water, and mix the seed well with it. Strain

through a fine sieve or canvas; rinse the seeds several times through more fresh water, then strain again and spread them on canvas or paper to dry.

UNCONTROLLED URINATION IN HEIFER.

"SETTLER," Matainui :—

I have a valuable four-months-old heifer calf which apparently suffers from some affection of the kidneys or bladder, as she appears to have no control over her water, which dribbles away almost continuously. She is in good condition, and appears to be well otherwise. Can you suggest a remedy?

The Live-stock Division :—

Continuous dribbling of urine is a common phenomenon of various diseases, especially diseased states of the spinal cord. It may be due to the circular muscle which controls urination becoming semi-paralysed or completely so. It is also common in young animals that have been fed on large quantities of linseed, either in the form of linseed mucilage or in the ground or crushed form. The treatment is therefore in accordance with the cause. When it is caused through impaired nerve function, nerve-stimulant should be given. The best nerve-stimulant is nux vomica. For a heifer four months old the dose would be 5 grains morning and evening given in 1½ pints of whole milk. If the cause is due to irritating substances in the food, such as excessive quantities of linseed, this food must be stopped. In these cases clean, crushed oats should be given twice daily, and the animal allowed to graze on a good, clean pasture—preferably one not containing an excessive quantity of nitrogenous elements such as clover.

FEEDING BACK FERMENTED HONEY TO BEES.

WILFRED N. DRAKE, Inglewood :—

I would be obliged if you could inform me of a method of disposing of fermented honey to bees in order that it may be extracted again this season.

The Horticulture Division :—

Feeding back fermented honey to bees is not recommended. It is apt to cause dysentery and other disorders. Unless it is positively certain that the honey is from an apiary free from foul-brood do not feed back under any consideration. If for some special reason it is desired to do so, mix with equal quantities of water and bring to the boil, then feed as syrup.

EWES IN SEASON.

"ROMNEY," Motupipi :—

I should be obliged if you could enlighten me as to the habits of a ewe at tupping-time when in season, the length of time she remains so, the time which elapses between her seasons, and the earliest time at which a ewe might be expected to take the ram.

The Live-stock Division :—

Signs are not so pronounced in the sheep as in other animals. When the rams are turned out with the ewes those in season seek him out and follow him about, bleating the while. The external genital openings are congested, and a discharge is present. This period lasts as a rule from one to two days. Oestrum occurs at about three-weeks intervals. A well-advanced ewe lamb would probably take the ram at eight to nine months, but this is not advisable.

HOME STORAGE OF APPLES.

F. HATFULL, Warkworth :—

I should be greatly obliged if you could inform me of a simple way of storing apples for household use in winter.

The Horticulture Division :—

The conditions required are a cool and as nearly as possible equable temperature, darkness, absence of draughts, and sufficient ventilation to allow the escape of carbonic-acid gas generated by the fruit. If this gas is confined it hastens maturity and consequent decay of the fruit. If subject to draughts, the air is rendered too dry and the fruit shrivels. Cold storage is designed to arrest the maturing process. Several kinds of storehouses are in use for considerable quantities of apples, such as the following: Excavation into a clay bank, the face of the building being boarded up, with a door in the middle; concrete walls with iron roof in which are glass lights, ventilation being provided by louvres; walls of scantlings covered on each side with wire netting, leaving a space of about 10 in., which is filled with tightly packed straw, the roof being covered with wire netting and thatched with straw, rushes, or raupo. When a special building is not practicable, a small room or the end of a shed boarded off will serve the purpose. Shelves are fixed to hold the fruit, which need not be placed in single layers. No straw or similar material should be used under the fruit, as it causes decay. Rats and mice must be excluded. Damaged fruit should be removed as soon as possible; the mould that grows on decaying fruit infects sound specimens and spreads very rapidly.

POISONING BY BUSH-HONEY.

"Interested," Raetihi :—

Will you kindly inform me if at any period of the year wild bush-honey is poisonous, and, if so, when may it be safely taken?

The Horticulture Division :—

Poisonous honey is gathered by the bees in the spring from the shrub *Brachyglottis repanda*, commonly called rangiora, and also from the small swamp-weed *Ranunculus rivularis*, commonly called waoriki. Poisoning cases usually occur in the spring, when the nectar is green or unripe—*i.e.*, when it contains an excessive amount of moisture, which must be evaporated by the bees before the combs are sealed. During this evaporation process the poison, being volatile, is evaporated, and none remains when the combs are capped or sealed. Poisoning cases in this country are extremely infrequent, and principally occur in the Auckland District.

PREVENTIVE MEASURES AGAINST BOT-FLIES.

S. A. Whyte, Carterton :—

Will you kindly advise me regarding the external treatment of bot-flies?

The Live-stock Division :—

The following preventive measures are recommended: The eggs, which are usually laid on the hair within reach of the animal's tongue, should be destroyed before being taken into the horse's stomach. This is best done by singeing, either with candle or wax taper, the hair on which the eggs are laid—usually shank, forearm, or shoulder. The parts may also be smeared with a preparation the odour of which the fly dislikes. The following is suitable for this purpose: Creosote, 2 drams; oil of eucalyptus and turpentine, ½ oz. of each; salad-oil, 1 pint.

The Tractor in Forestry Operations.—The Conservator of Forests for the Rotorua region remarks as follows in last year's annual report of the State Forest Service: "The ploughing and harrowing of fire-breaks has been more economically and expeditiously performed since a tractor was purchased for this work. Ninety per cent. of the fire breaks at Kaingaroa and Waireka, as well as a considerable portion of the fire-breaks at Waiotapu have been kept in an efficient state entirely by the use of the tractor. Two five-horse teams would have been required to perform the same amount of work, with the added disadvantage that feed and water would have had to be carted to the teams."

TENURE OF LAND OCCUPIED IN NEW ZEALAND (excluding Boroughs): 1920–21.

Land District.	Freehold occupied by Owner.	Leased from Private Individuals.	Leased from Public Bodies.	Leased from Maoris.	Crown Lands.		Tenure not specified.	Total Area occupied.
					Held under Pastoral Lease or License.	Held under other Tenures.		
	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.	Acres.
North Auckland	2,344,592	108,778	28,984	79,616	103,407	344,597	58	3,010,032
Auckland ..	2,629,883	150,378	42,227	439,111	211,176	920,405	3	4,393,183
Hawke's Bay ..	2,792,268	222,161	122,081	680,480	289,574	594,302	..	4,700,866
Taranaki ..	880,543	143,850	48,423	115,161	83,314	440,439	..	1,711,730
Wellington ..	3,198,742	378,911	82,968	368,475	260,547	528,776	285	4,818,304
Nelson.. ..	597,160	59,031	6,718	14,776	174,663	472,651	..	1,324,999
Marlborough ..	794,073	46,501	5,291	26,092	1,259,709	437,592	..	2,569,258
Westland ..	160,245	18,079	5,007	5,088	1,293,512	290,253	..	1,772,184
Canterbury ..	3,079,769	371,539	240,754	10,397	3,764,157	611,549	..	8,078,165
Otago	1,657,502	195,211	96,935	6,811	4,751,747	1,211,244	..	7,919,450
Southland ..	1,536,878	101,594	114,178	4,798	1,180,400	310,738	..	3,248,586
Totals, 1920–21	19,671,255	1,796,033	793,566	1,750,805	13,372,206	6,162,546	346	43,546,757
Totals, 1919–20	19,483,098	1,904,237	882,791	1,846,188	13,357,417	5,999,344	4	43,473,079

THE NEW CATTLE-TICK REGULATIONS.

AMENDED regulations under the Stock Act for the purpose of the eradication and prevention of spread of the cattle-tick in the Dominion were gazetted on 16th February and came into force on that date. They supersede the regulations gazetted on 2nd October, 1919. Two areas have now been defined: Area A—all the territory to the north of a line drawn from Manukau Harbour to Coromandel; and Area B—all the territory south to a line from Kawhia to Cape Runaway. Dipping of cattle in Area A is made compulsory, and no cattle are allowed to leave the area before they have been through an approved dip. No cattle are allowed to leave Area B without a permit from a Stock Inspector. The text of the regulations is as follows:—

1. In these regulations, unless inconsistent with the context, "cattle-tick" means any parasite of the family Ixodidae, and does not include the parasite known as the sheep-tick (*Melophagus ovinus*); "stock" means and includes horses, cattle, and dogs; "clean country" means all that part of the Dominion of New Zealand outside the areas described in schedules hereto.

2. The areas described in the Sixth and Seventh Schedules hereto are hereby declared to be infested areas. The area in the Sixth Schedule is hereinafter referred to as "Area A," and the area in the Seventh Schedule as "Area B."

3. If the boundary-line between Areas A and B passes through any property owned by one person, the whole of such property shall, for the purpose of these regulations, be deemed to be in Area A; and, similarly, if the boundary-line between Area B and clean country passes through any property owned by one person, the whole of such property shall, for the purpose of these regulations, be deemed to be in Area B.

4. The removal of stock from land on which cattle-tick is known to exist is hereby prohibited, unless such removal takes place in accordance with the conditions hereinafter prescribed.

5. Every person who, by himself, his agent or servant, drives, without permission of the Inspector, any stock affected with cattle-tick across or upon any other land, or drives, depastures, or suffers any such stock to stray upon or along any highway, is liable to a fine not exceeding £50 and not less than £2 for every day during which such stock are so driven, depastured, or suffered to stray.

6. Any person finding cattle-tick present on stock in his possession or under his charge shall, within twenty-four hours thereafter, notify the fact to the Inspector of Stock for the district.

7. All stock harbouring cattle-tick shall be so treated as to ensure the complete destruction of all cattle-ticks upon them, such treatment to be either—(*a*) Dipping by complete immersion in an effective cattle-tick-destroying solution which shall contain not less than 7 lb. of arsenious oxide in each 400 gallons of water; or (*b*) some other effective method authorized by the Inspector. After treatment as aforesaid such stock shall not be removed to any other place unless in accordance with conditions hereinafter prescribed.

8. Notice of intention to remove stock from any land on which cattle-tick is known or suspected to exist must be given to the Inspector of Stock for the district in which such stock are located at least seven clear days before the date of their proposed removal, and such stock must be dipped or otherwise treated as required by the Inspector before they are removed from such land, and shall not thereafter be placed in any paddock or enclosure where cattle-tick is believed to exist, or allowed to come into contact with any other stock which are infested with cattle-tick.

9. No cattle shall be shipped from any port in the North Island unless they have been first examined by an Inspector and declared free from infestation by cattle-tick.

10. Within the prescribed Area A the dipping or other authorized method of treatment of all stock infested with cattle-tick, or which have been in contact with stock so infested, is compulsory during the period from the 1st September to the 31st March in each year. Within the period above specified all stock which are infested with cattle-tick, or which have been in contact with stock so infested, must be dipped or otherwise treated as defined in clause 7 of the regulations at intervals of not more than twenty-one days.

11. Any person desiring to remove stock from Area A must first obtain a permit, in the form of the First Schedule hereto, from an Inspector, or some person authorized by an Inspector, authorizing their removal, and such stock may thereafter leave Area A only at the place and within the time specified in such permit.

12. An Inspector, or other person authorized by an Inspector, may issue a permit as provided in the last preceding section only in respect of stock which have been dipped as provided in clause 7, subclause (*a*), of these regulations, and the time specified in the permit during which such stock may leave Area A shall be within thirty hours from the time they were last so dipped: Provided, however, that horses crossing the boundaries of Areas A or B may do so in accordance with the provisions of sections 15 and 16 of these regulations. Immediately before stock are removed from Area A the person in charge of them shall deliver the permit to the person indicated therein.

13. Any person desiring to remove stock from Area B to clean country shall first obtain a permit, in the form of the Second Schedule hereto, from an Inspector authorizing their removal, and such stock may leave Area B for clean country only at the place and within the time specified in such permit. Immediately before stock are removed from Area B the person in charge of them shall deliver the permit to the person indicated therein.

14. If an Inspector has reason for believing that cattle-tick exist on any land in Area B from which stock are to be removed to clean country, he may require the owner of such stock to dip or otherwise effectively treat them for cattle-tick before issuing a permit for their removal.

15. In the case of horses which are in constant use crossing the boundary between the Areas A and B, or B and clean country, an Inspector of Stock may issue a permit, in the form of the Third Schedule hereto, authorizing the horses being taken over such boundary at the place specified in the permit without being previously examined, dipped, or otherwise treated, during such period as he considers advisable, provided that such horses are at all times kept free from living cattle-ticks.

16. In the event of any horse or horses which are covered by a permit as provided in the last preceding section being found affected with living cattle-tick at any time during the currency of such permit, the Inspector shall forthwith cancel the permit, and may thereafter refuse to issue a further permit to the owner or person in charge of such horse or horses, and such owner or person in charge shall, notwithstanding the holding of a permit under clause 15 hereof, be deemed guilty of an offence under clause 5 of these regulations.

17. If any stock affected with cattle-tick is found in any pound, or in any yard or yards or on any land or other place at which stock are offered for sale or exhibition, the owner exposing such stock so affected shall be liable to a fine not exceeding £20 for every head thereof.

18. The Inspector shall order the withdrawal from sale or exhibition of any stock affected with cattle-tick, and the owner of such stock shall dip or otherwise effectively treat them in such a manner as to destroy all cattle-tick upon them forthwith at such place and in such manner as the Inspector may direct. Such withdrawal shall not release the owner from his liability in respect of any breach of the said Act or these regulations.

19. Any conveyance which has been used or is suspected of having been used for the carriage of stock affected with cattle-tick shall be thoroughly cleansed before being again used.

20. At all cattle-dips within Area A a record-book, in the form of the Fourth Schedule hereto, shall be kept by the person in charge of the dip, in which the particulars therein provided for shall be entered in respect of each lot of stock immediately after they have been dipped, and such book shall be open at all times for inspection by an Inspector or other authorized person.

21. An Inspector shall have free access to any cattle-dip at all reasonable times, and may take samples of the dipping-solution contained in any cattle-dip for the purpose of testing or analysis. In the event of such test or analysis demonstrating that the dipping-solution in any dip is not in accordance with the recognized formula, the Inspector shall notify the owner or person in charge of such dip accordingly, and advise him what action to take to remedy the defect, and it shall be the duty of the owner or the person in charge to remedy the defect forthwith.

22. The removal from Area A of paspalum-grass seed produced within the area is hereby prohibited, unless a permit, in the form in the Fifth Schedule hereto,

is first obtained from an Inspector authorizing its removal. An Inspector may authorize the removal of such seed from Area A to any destination after it has been fumigated as required by the Department of Agriculture, or he may authorize its removal from Area A to the nearest fumigating plant for treatment. When the latter course is adopted further authority must be obtained from an Inspector or other authorized person before the seed may be removed from the fumigator after treatment.

23. Every person is liable on conviction to a fine of not less than £5 and not more than £200 who—(*a.*) Takes or allows to pass out of infested Area A any stock without first complying with the provisions of section 11 of these regulations: (*b.*) Takes or allows to pass out of infested Area B into clean country any stock without first complying with the provisions of section 13 of these regulations.

24. Every person contravening any of the provisions of the foregoing regulations for which a penalty is not therein specially provided shall be liable on conviction to a fine of not less than £2 and not more than £50.

THE SCHEDULES.

Schedules 1 to 5 consist of official forms. Schedules 6 and 7, defining the two areas and the crossing-places, are here appended :—

SIXTH SCHEDULE.—AREA A.

All that area included to the north of Area B, and the Great Barrier Island.

Crossing-places.

(1.) At Whau River bridge. (2.) Coromandel Coast Road at the bridge over the Te Mata River, near Tapu. (3.) On the Katikati–Waihi Road where it intersects the boundary between the Ohinemuri and Tauranga Counties. (4.) On Thompson's Track where it crosses the boundary between Piako and Tauranga—to be served by dips which are being erected at Katikati and Ongatete, each about ten miles distant from the crossing-place. (5.) Kaimai Track where it crosses the county boundary between Matamata and Tauranga Counties. (6.) At the bridge on the Rotorua–Tauranga stock-road at Awahou. (7.) Crossing-place at Te Ngae, at the junction of the Whakatane–Paengaroa–Rotorua Roads. (8.) Crossing-place where the Rangitaiki River intersects the confiscation-line, approximately six miles north of Te Teko. (9.) Crossing-place on Waioeka Valley Road where it crosses county boundary between Opotiki and Waikohu Counties. (10.) Crossing-place at bridge over Motu River at Motu Village. (11.) Crossing-place at mouth of Motu River at Maronui.

SEVENTH SCHEDULE.—AREA B.

Commencing at the southernmost extremity of the boundary between Waitemata and Eden Counties; thence by that boundary to the Whau Inlet; thence by the coast-line of the Waitemata Harbour and Firth of Thames to the mouth of the Te Mata River; thence by that river to its intersection with the Thames–Coromandel Coast Road; thence southwards by that road to the Coroglen Track, and by this track to its intersection with the Thames-Coromandel County boundary; thence eastwards along that county boundary to the sea; thence by sea-coast to its junction with the Ohinemuri-Tauranga County boundary; thence by that boundary till it meets the Piako County; thence following the western boundary of Tauranga County to where it meets the Rotorua County boundary; thence along that boundary to the Puwhenua Trig.; thence in a south-westerly direction by the county boundary to the southern boundary of the Mangarewa-Kaharoa No. 6E No. 3 Block; thence in an easterly direction along the southern boundary of that block to the Awahou Stream, and by that stream to the shore of Lake Rotorua; thence by the northern shore of Lake Rotorua to Te Ngae, at the junction of the Whakatane–Paengaroa Road; thence by the Whakatane Road to its intersection of the Whakatane County boundary; thence along that boundary to the confiscation-line, and eastwards by the confiscation-line to the Tapapakiakia Trig.; thence along the western and southern boundaries of the Tuhua or Ruatoki Block to the Whakatane River; thence by the Whakatane River to the southern boundary of Block VI, Waimana Survey District: thence eastwards by the said block boundary and the southern boundary of Block VI, Waimana Survey District, to the Waimana River; thence southwards by that river to its junction with the Ohaki Stream; thence eastwards by a straight line

to the north-western corner of the Waikohu County at its junction with the Korangu Stream; thence following the Opotiki-Waikohu County boundary to the Motu River; thence by the said river to the sea; thence by the sea-coast to the boundary of the Matakaoa and Opotiki Counties; thence by that boundary to its junction with the Waikohu County boundary; thence following the watershed in a south-westerly direction to Trig. Station N4; thence in a southerly direction to Trig. Station 141; thence following southern boundary-line of area named Mangatu No. 4 to its most southerly point; thence in a southerly direction by the eastern boundaries of Sections 2 and 1 of Block VIII, Motu Survey District, to the Rangiriri Stream; thence by the Rangiriri Stream to its junction with the Waihuka Stream; thence along that stream to its head at south-western corner of Section 2, Block XIV, Motu Survey District; thence in a south-westerly direction by a public road through Sections 4, 5, and 2 to Trig. Station 62 at Pukahika; thence following block-line between Blocks II and VI in a westerly direction to Maungatapere Trig. Station: thence by a right line to the north-east corner of Section 12, Block VIII, Waikohu Survey District; thence by the northern boundary of the said Section 12, and that line produced to Te Wana Trig. Station on the Opotiki County boundary; thence by the eastern and southern boundary of that county to its intersection by the Tauranga Stream; thence northwards along the Tauranga Stream to the junction of the Ohaki Stream; thence by a straight line to Tawhiuau Trig., the north-eastern corner of East Taupo County; thence along the northern boundary of that county to its intersection with the Rangitaiki River at the Murupara Bridge crossing; thence generally southwards along that river to its intersection with the Taupo–Napier Main Road at Rangitaiki Post and Telegraph Office; thence along the said road to Waipahihi, on the shores of Lake Taupo; thence by those shores to the junction with the Waikato River; thence along that river to its intersection with the boundary-line between Wharepuhunga and Maungatautari Blocks; thence along that boundary-line to the Owairaka Stream; thence along that stream and the Puniu River to its junction with the Waipa River at the northern boundary of Waitomo County; thence along that boundary to the Kawhia County boundary; thence by right lines to the Pirongia Trig. and the easternmost inlet of the Oatea Harbour; thence by the northern coast of that harbour to the sea-coast; thence generally northwards by the sea-coast to the northern heads of the Manukau Harbour, and by the northern shore of that harbour to the point of commencement.

Crossing-places.

(1.) Bridge crossing Waipa River on Pirongia–Kawhia Road at Pirongia. (2.) Te Mawhai–Kakepuka Road at the bridge where it crosses the Puniu River. (3.) At the bridge over the Puniu River on the Kihikihi–Otorohanga Road. (4.) At the bridge over the Waikato River on the Kihikihi–Putaruru Road, known as the Waotu Bridge. (5.) At the bridge which crosses the Waikato River at Atiamuri, on the Rotorua–Taupo Road. (6.) At the bridge over the Waikato River on the Waiotapu–Taupo Road at Waimahana. (7.) At the bridge over the Waikato River on the Waiotapu–Taupo Road at Taupo. (8.) Crossing at Waipihihi on Lake Taupo at the junction of the Tokaanu–Taupo Road with the Taupo–Napier Road. (9.) Bridge crossing Rangitaiki River on the Taupo–Napier Road at Rangitaiki. (10.) Bridge crossing the Rangitaiki River at Murupara on the Rotorua – Murupara – Te Whaiti Road. (11.) Crossing at roads-junction at Rakauroa. (12.) Crossing at roads-junction at south-east corner of Section 1, Block XII, Motu Survey District, at Rangiriri Stream. (13.) On the Cape Runaway Road where it crosses the Opotiki County boundary near Cape Runaway.

HONEY-EXPORT REGULATIONS.

NEW regulations relating to the export of honey from New Zealand were gazetted and came into force on 16th February. The text will be recorded in next issue of the *Journal*. The following have been appointed grading-stores: Auckland, Wanganui, and Wellington respectlvely—New Zealand Express Company's store; Lyttelton—Harbour Board's store; Timaru—New Zealand Refrigerating Company's store, Smithfield; Dunedin—South Island Dairy Association's store; Bluff—Harbour Board's store.

FREIGHT ON LIVE-STOCK TO SOUTH AMERICA.

THE Department recently approached the overseas shipping lines with a view to obtaining reductions in the freight rates on purebred live-stock exported from New Zealand, and better facilities for the trade generally, with special reference to South America. After considering the matter the shipping companies communicated with the Department under date 22nd February, quoting rates and conditions as follows :—

"Sheep : Six guineas net per head, with a minimum freight of £200 to Monte Video, which is the only port of call for vessels proceeding from New Zealand to South America. Cattle : First five, £30 each ; second five, £25 each ; all over ten, £20 each. The minimum freight to warrant a call will be £200. It is immaterial whether this amount of £200 is made up of cattle and/or sheep. Food for voyage : The ship provides water only ; cost of fittings, food, and attendance are the obligations of the owners of the stock. As far as stud sheep and cattle are concerned, rates will be quoted on application for high-priced animals." The above rates amount to reductions of four guineas per head on sheep and £5 per head on cattle.

MEAT-EXPORT CONTROL.

MEMBERS of the New Zealand Meat-producers' Board have been officially appointed as follows : Messrs. A. E. Harding and D. Jones, representatives of the Government ; Messrs. T. A. Duncan, J. C. N. Grigg, A. Hamilton, J. S. Jessep, and W. Perry, representatives of the producers of meat, as elected by the committee constituted for that purpose ; and Mr. W. D. Hunt, representing the stock and station agents.

A regulation under the Act, gazetted on 11th March, prescribed the maximum charges to be paid by way of levy in respect of meat exported from New Zealand as follows : Lamb or mutton, 2d. per carcase ; beef, 1d. per quarter or 2d. per side. It was notified in the same *Gazette* by the Minister of Agriculture that the Meat-producers' Board had fixed the following actual amounts of levy on all meat shipped on the exporting vessel after 11th March : Lamb or mutton, 1d. per carcase ; beef, ½d. per quarter or 1d. per side.

FARMERS' SCHOOL AT WERAROA.

THE Department has arranged to hold a school for farmers—on the lines of the popular Ruakura school—at the Central Development Farm, Weraroa (Levin), commencing 24th April next. The course will run from Monday to Friday inclusive. Farmers of the Wellington Provincial District are cordially invited to attend. Communications should be addressed to the Manager, Central Development Farm, Weraroa, who will supply any further information and enrol applicants. A moderate charge will be made for board. The Ruakura Farm school will commence this year on 15th May.

FORTHCOMING AGRICULTURAL SHOWS.

Methven A. and P. Association : Methven, 30th March.
Temuka and Geraldine A. and P. Association : Temuka, 30th March.
Oxford A. and P. Association : Oxford, 6th April.
Mackenzie County A. and P. Association : Fairlie, 17th April.
Otago A. and P. Society : Dunedin (Winter Show), 30th May to 3rd June.
Manawatu and West Coast A. and P. Association : Palmerston North (National Dairy Show), 20th to 23rd June.

(A. and P. Association secretaries are invited to supply dates and location of their shows.)